

DOCUMENT RESUME

ED 309 289

CE 052 932

AUTHOR Swartz, Janet P.
TITLE Evaluation of the Massachusetts Competency-Based Vocational Education Program. Final Report.
INSTITUTION Abt Associates, Inc., Cambridge, Mass.
SPONS AGENCY Massachusetts State Dept. of Education, Quincy. Bureau of Research, Planning, and Evaluation.
PUB DATE 30 Jun 89
NOTE 168p.
PUB TYPE Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC07 Plus Postage.
DESCRIPTORS Administrator Attitudes; *Competency Based Education; *Learning Modules; Program Evaluation; *Program Implementation; Secondary Education; Teacher Attitudes; *Teacher Developed Materials; *Vocational Education
IDENTIFIERS *Massachusetts

ABSTRACT

A study obtained information about implementation and impact of competency-based vocational education (CBVE) in Massachusetts secondary schools. Information was collected from teachers, administrators, Division of Occupational Education staff, the State Leadership Team, and staff at the Massachusetts Vocational Curriculum Resource Center. Findings indicated that teachers from two or more districts shared the writing of each CBVE learning guide. A review of the learning guides showed that they could benefit from updating, clearer writing, and correction of grammatical errors. Specific recommendations were provision of information specific to the context and purpose of tasks in task introductions and instruction sheets; specification of standards for mastery; better quality diagrams and illustrations; and revision of knowledge tests and student self-checks to meet standards. The learning guides were used as student instructional materials, teacher references, and resources for district-level curriculum development. Factors associated with CBVE implementation were: a "key player" enthusiastic about CBVE and knowledgeable about implementation; new teachers looking for curriculum ideas; administrative interest in program improvement; and technical assistance. Teacher concerns about use of CBVE learning guides focused on vocational students' poor reading skills and active learning style, teacher role, and appropriateness in shop and related classes. (Instruments are appended.) (YLB)

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EVALUATION OF THE
MASSACHUSETTS COMPETENCY-
BASED VOCATIONAL
EDUCATION PROGRAM

Final Report

Janet P. Swartz

June 30, 1989

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ACKNOWLEDGEMENTS

This study required the cooperation of many people involved in vocational education at the state and local level. While it is not possible to personally thank everyone involved in the study, I want to acknowledge the contribution of several groups and individuals across the state.

First, I want to thank the teachers and administrators in the school districts that we visited. They graciously shared their time and thoughts with us during our site visits, and were a critical part of this study. In addition, I want to acknowledge the time and effort of the administrators and school staff who participated in the mail survey.

A special thanks goes to the members of the State Leadership Team who gave so freely of their time. In particular, Sheila Herbert answered questions about the CBVE project on numerous occasions and made the curriculum materials available to us for review.

Several individuals in the Division of Occupational Education made important contributions to this study. In particular, I want to thank Rose Giaconia, the Project Officer for this study, and John McDonagh, Director of Research, in the Bureau of Planning, Research and Evaluation for their guidance and advice about the design and conduct of this study. I also want to thank Dr. David Cronin, Associate Commissioner, and Elaine Cadigan, Director of Program Services, for their insights about CBVE and vocational education in the state. In addition, I appreciate the willingness of the Team Leaders and staff in the regional education centers to share their views and experiences regarding the state CBVE project.

Recognition also is due the staff at the Massachusetts Vocational Curriculum Resource Center for their assistance during our numerous visits and for loaning CBVE materials to us.

At Abt Associates, I want to acknowledge the contributions of Marc Moss and Felisa Tibbitts for their effort, enthusiasm and analytic thought in the design of the data collection instruments, the conduct of the site visits and the interpretation of the study's findings. I also want to thank Annette Butler for her capable production of the final report.

EXECUTIVE SUMMARY

This report presents the findings from a study conducted by Abt Associates for the Division of Occupational Education in the Massachusetts Department of Education about the implementation and impact of competency-based vocational education (CBVE) in secondary schools in Massachusetts. Information for this study was collected from multiple perspectives through a variety of research methodologies, including:

- a statewide mail survey to administrators in districts with Chapter 74 programs;
- a review of CBVE curriculum materials;
- interviews with Division of Occupational Education staff, both in the central office and the regional education centers;
- visits to Massachusetts Vocational Curriculum Resource Center (MVCRC) to review materials and interview staff;
- interviews with members of the State Leadership Team; and
- site visits to ten school districts across the state.

This summary highlights the study's key findings and presents recommendations for the next steps of the Massachusetts CBVE project.

Development and Dissemination of Massachusetts CBVE Materials

- The Massachusetts CBVE Learning Guides are written by vocational teachers during summers and after school hours during the school year.
- Teachers from two or more districts divided the tasks within one vocational area, so that the writing of each Learning Guide was shared by multiple districts in different parts of the state.
- Teachers described writing the CBVE Learning Guides as a time-consuming process to accomplish within the allotted timeframe. In most cases, it took more than one school year to complete a Learning Guide. Nevertheless, several teachers indicated that it was a positive experience which contributed to their professional development and knowledge of their field.
- All teachers received some type of training about competency-based vocational education and about writing CBVE Learning Guides prior to developing the curricula.
- Discussion of the task listings and division of the labor occurred at the annual summer Professional Development Conference. In nearly all cases, teachers from different schools did not get

together again to discuss the development of a particular Learning Guide.

- English teachers in many of the districts that developed the Learning Guides served as editors by proofreading materials for grammatical and spelling mistakes. In some cases, members of the State Leadership Team performed this function.
- Vocational teachers voiced concern that editing of technical material could not be done adequately by people who were not familiar with the terminology and content of the particular vocational field.
- CBVE Learning Guides are distributed to districts with five or more Chapter 74 programs by the State Leadership Team through dissemination workshops held at Greater Lowell Vocational-Technical School. Other districts may receive Learning Guides by request.
- District administrators attend the dissemination workshops. It is then their responsibility to distribute the CBVE materials to the appropriate teachers or department heads.

Survey Results

- Nearly all administrators (88%) in districts with Chapter 74 programs have heard about competency-based vocational education. All of the administrators who have not heard of CBVE work in districts with fewer than five Chapter 74 programs.
- More than 70% of administrators are familiar with CBVE concepts and have reviewed competency-based curriculum materials.
- The two most common ways that administrators have heard about CBVE are through publications or workshops sponsored by the Division of Occupational Education, the Massachusetts Vocational Curriculum Resource Center (MVCRC) or the State Leadership Team.
- Sixty-five percent of districts with Chapter 74 programs currently use some type of competency-based curriculum in their vocational classes. "Use" was broadly defined to include accessing materials as references or resources.
- The use of competency-based curricula is strongly related to the number of Chapter 74 programs in the district — only 38% of districts with fewer than five Chapter 74 programs use CBVE materials, as compared with 86% of districts with five or more Chapter 74 programs.

- Among districts using some type of competency-based curriculum, 85% use the Massachusetts CBVE Learning Guides, 63% use materials developed by district staff, and 54% use materials from other states or organizations (e.g., Oklahoma, Mid-America Vocational Curriculum Consortium).
- The two most common reasons why districts use competency-based materials other than the Massachusetts Learning Guides are: (a) that the state CBVE materials were not developed when the district wanted to implement competency-based curricula, and (b) that district staff chose to develop their own CBVE materials.
- Districts generally use a combination of types of competency-based materials. More than one-third of districts that use some type of competency-based curriculum materials indicated that they use the Massachusetts CBVE as well as materials developed by district staff and/or other states and organizations. Only 18% use the Massachusetts materials alone, while 10% use other types of competency-based materials and not the Massachusetts materials.
- Individual districts use as many as eleven of the thirteen available Massachusetts CBVE Learning Guides. Districts with fewer than five Chapter 74 programs report using an average of 1.9 Learning Guides, while districts with five or more Chapter 74 programs report using an average of 4.6 Massachusetts CBVE curricula.
- The four Massachusetts CBVE Learning Guides used by more than 70% of the districts offering the course are: auto mechanics (79%), health assistant (71%), hotel and lodging (89%), and ornamental horticulture (78%).
- The three most common strengths or advantages of the Massachusetts CBVE materials cited by administrators are: the benefits of individualized learning for students; the value of the materials as curriculum resources for teachers; and the importance of accountability and measurable student results.
- The three most common disadvantages or weaknesses of the Massachusetts CBVE materials cited by administrators are: the need for adaptation by district staff; the difficulty of the material for students; and the overwhelming size of the materials.
- Math/Science Competencies are used by only 14% of the districts that use some type of competency-based vocational curriculum. The most prevalent areas used are: auto mechanics, electrical technology, hotel and lodging, and ornamental horticulture.

Review of Massachusetts CBVE Learning Guides

- All of the CBVE Learning Guides would benefit from revisions to update both the information and references included; to improve the clarity of the writing; and to correct errors in spelling and punctuation.
- In particular, the task introductions and instruction sheets should provide information specific to the context and purpose of tasks to be performed, in language and style that is clear and easily understood by high school students.
- Standards for attaining mastery should be specified for all performance objectives.
- Diagrams and illustrations should be well-labeled and clearly reproduced. Where possible, the quality of the drawings should be enhanced by incorporating material from textbooks or trade manuals, professional material or computer-generated graphics.
- Knowledge tests and student self-checks should be revised to meet accepted standards for test construction. Fill-in-the-blank questions should be replaced with exercises that require more student thought, such as labeling diagrams, ordering the necessary steps in a task, or diagnosing hypothetical problems.

Use of CBVE Curriculum Materials in Vocational Classrooms

- The Massachusetts CBVE Learning Guides are used as student instructional materials, teacher references and resources for district-level curriculum development.
- While a few of the teachers interviewed use the Massachusetts CBVE curricula as self-paced individualized instructional materials, most teachers incorporate these materials into more traditional group instruction.
- In schools where teachers are actively incorporating the CBVE Learning Guides into their vocational classes, there tends to be a "key player" in the school who is enthusiastic about CBVE and knowledgeable about the process of implementation.
- Other factors that are associated with the implementation of CBVE are: new teachers looking for curriculum ideas and a new program or administrative interest in improving existing programs.
- Starting a CBVE program with an incoming group of ninth graders and receiving technical assistance at the school site also facilitate implementation.

- In some districts, teachers prefer the simpler format or teacher-focus of other types of competency-based materials, such as from Oklahoma or Mid-America.
- A number of teachers do not use the Massachusetts CBVE materials at all in their teaching. These are usually teachers who have been teaching for a number of years and have a curriculum with which they are comfortable.
- Concerns teachers expressed about the use of the CBVE Learning Guides focus on the poor reading skills and active learning style of vocational students, the role of the teacher in a competency-based classroom, and the appropriateness of the Learning Guides in shop and related classes.
- Teachers and administrators did not always fully understand the characteristics or components of the Massachusetts CBVE curriculum. Teachers, administrators and regional staff pointed to the need for continued opportunities for technical assistance, particularly by vocational areas.

Conclusions and Recommendations

It is clear that a substantial amount of effort has gone into the development of the Massachusetts CBVE Learning Guides. The state's involvement in curriculum development has been commended by teachers and administrators. In addition, the process of developing and reviewing these materials has been a catalyst to other efforts to improve vocational curricula by districts as well as individual teachers. Recommendations about how to build on this support and improve these materials are:

1. Begin a systematic process of editing the CBVE Learning Guides that have been disseminated.
2. Enlist vocational teachers who are using and adapting the CBVE Learning Guides to revise the content of these curriculum materials.
3. Focus efforts on revising the Learning Guides that currently exist rather than developing CBVE Learning Guides in additional vocational areas.
4. Coordinate efforts that are presently underway to enter the Learning Guides onto computer systems in order to facilitate revisions and upgrade the quality of illustrations.

In addition to revising the materials, the other focus of the Massachusetts CBVE project should be on providing technical assistance to administrators and teachers about the content of the CBVE Learning Guides and the issues of implementing these curriculum materials in vocational classrooms. As the avenues for technical assistance have expanded in the last year, the interest in and utilization of the CBVE Learning Guides has increased. Recommendations for building on these successes are:

1. Increase the number of staff and centers providing technical assistance to vocational teachers.
2. Establish avenues for vocational teachers to share information about implementing CBVE curricula.
3. Widen the network of administrators who receive information about CBVE and provide more specific information about implementation issues.
4. Provide technical assistance to teachers that addresses their concerns about competency-based instruction and facilitates use of the Massachusetts CBVE Learning Guides as self-paced instructional materials.
5. Target technical assistance and information about implementing CBVE to individuals and districts most receptive to new curriculum materials: new teachers and to districts in the process of revising their vocational curricula.

CHAPTER I

INTRODUCTION: PURPOSE AND CONTEXT OF THE STUDY

This report presents the findings from a study conducted by Abt Associates Inc. (AAI) for the Division of Occupational Education in the Massachusetts Department of Education about the implementation and impact of competency-based vocational education (CBVE) curriculum materials in secondary schools in Massachusetts. The study is both descriptive and evaluative. Its main objectives are to:

- examine the process of CBVE curriculum development;
- evaluate the CBVE curriculum materials developed;
- describe the extent of implementation and impact of the curricula in secondary vocational programs across the state;
- evaluate the effectiveness of the technical assistance provided to district staff in developing and implementing the CBVE curricula; and
- offer recommendations for improving the CBVE effort in Massachusetts.

The remainder of this chapter provides an introduction to competency-based education and CBVE as well as a brief description of the CBVE project in Massachusetts. The final section of the chapter describes the organization of this report.

Context for Program Improvement

During the last ten years, there have been a number of efforts at the federal and state level to improve vocational education. Current concern over the quality of vocational education programs and the competency of their graduates can be seen in the statement of purpose that introduces the 1984 revision to the federal Vocational Education Act. Among the primary purposes of the Carl D. Perkins Act (PL 98-524) is the need to "assist the States to expand, improve, modernize, and develop quality vocational education programs in order to meet the need of the Nation's existing and future work force for marketable skills...". A clear priority of the law is to increase student access to quality vocational programs, particularly among students traditionally underserved by vocational education, such as handicapped, disadvantaged and limited-English-proficient students.

The challenges faced by vocational education are reflected not only in the stated goals of the Perkins Act, but also in the allocation of funds outlined under the law. With the intent of improving vocational education programs, the Perkins Act targeted nearly half of the basic grants to states to the Vocational Education Improvement, Innovation and Expansion Program. It was hoped that these federal monies would encourage and support state and local education agencies to "expand, improve, modernize or develop high quality vocational education programs." The law lists curriculum development in vocational education as one of the possible uses for these funds and encourages states to develop model curricula.

Principles of Competency-Based Education

A competency-based approach to instruction has been hailed as an effective and efficient model for educational curricula (Polk, 1982). Competency-based education focuses on student mastery of specific tasks or competencies that are identified prior to instruction. The concept is not new, but rather builds on the work of several prominent educators of the 1960s.

In the early 1960s, John Carroll made the provocative claim that given sufficient time, most students could learn anything. Benjamin Bloom interpreted this to mean that differences in students' aptitude for learning were really differences in the time needed to master a given subject; by the late 1960s, Bloom had developed an approach to instruction that he termed mastery learning (Polk, 1982). At the same time, Keller developed the Personalized System of Instruction. Although the two systems differ in many ways, they both involved setting measurable learning objectives, testing for mastery, and having students progress through a sequence of materials at their own pace until mastery is attained.

With increased public concern for accountability in education during the 1970s and 1980s, the concept of competency-based education has received renewed attention. By focusing on the skills necessary in a particular field, competency-based education creates a system of instruction and student evaluation that is directed toward measurable results. In fact, Blank (1982) states that a competency-based training program is "designed, monitored and adjusted with one thing in mind--results." Competency-based instruction specifies the criteria for mastery so that teachers, students and parents understand the goals and the outcomes of learning. In this way, competency-based programs have a built-in mechanism for accountability.

Competency-Based Vocational Education (CBVE)

As concerns have arisen in vocational education about the qualifications and preparedness of vocational students for the labor force, competency-based education has been seen as a way of improving vocational instruction and increasing accountability and public confidence in vocational training. When applied to vocational programs, competency-based education is called competency-based vocational education or CBVE. While vocational education always has focused on the tasks and skills necessary for employment, CBVE provides a framework for organizing instructional content and evaluating student performance. In addition, since the emphasis is on an individual student's attainment or mastery of a skill, CBVE offers a self-paced, individualized method of instruction (Polk, 1982).

The CBVE Project in Massachusetts

The Division of Occupational Education within the Massachusetts Department of Education selected competency-based vocational education as a system well-suited to meet the objectives of vocational education in the state (McLean, 1984). Since 1981, the Division has supported a statewide curriculum development partnership with vocational-technical schools to create CBVE curriculum materials (Division of Occupational Education, 1988). The Division of Occupational Education (1988) describes the Massachusetts CBVE project as based on two key principles of student learning:

- Competency is the ability to independently and satisfactorily perform job-related tasks in an occupational setting; and
- Most students can master most tasks at high levels of proficiency if given high quality instruction and sufficient learning time.

The first principle is related to Blank's premise of measurable results and the emphasis on skill or task mastery that is fundamental to competency-based education. The second principle is linked to the underlying assumption of Bloom's mastery learning and Carroll's bold statement about student learning capacity.

The primary products of the Massachusetts CBVE project are competency-based curriculum materials or Learning Guides. To date, Massachusetts CBVE Learning Guides have been developed and disseminated in 22 vocational areas. Four completed CBVE Learning Guides were disseminated in 1985, six in 1986, and three in 1987. During 1989, nine Learning Guides were disseminated. Three Learning Guides are still under

development. Exhibit 1.1 lists the vocational area and the dates of development and dissemination of each Massachusetts CBVE Learning Guide.

In addition to CBVE Learning Guides, the Division of Occupational Education has supported the development of Math/Science Competencies. The goal of this project, begun in 1984, is to identify specific math and science skills necessary for competence in each vocational area. Math/Science Competencies for nine vocational areas were disseminated during 1986 and 1987, with another nine disseminated during 1989.

The vocational areas and dates of dissemination of the available Math/Science Competencies are presented in Exhibit 1.2. In their present form, these manuals provide a matrix of general math and science competencies and lists of specific competencies necessary for each task used in the corresponding Learning Guide. Work also has begun on developing learning activities (i.e., math problems, science activities) in specific vocational areas in the same format as the CBVE Learning Guides. Two such manuals were distributed to schools in February, 1989: Vocational Applications of Math Concepts and Vocational Applications of Physical Science Concepts.

In 1986, the Division of Occupational Education initiated a Communications Competency Project to identify communication skills (e.g., speaking, writing, vocabulary) necessary for competence in specific vocational areas. Since this project is just in the early stages of development, it is not under the purview of this study.

Components of Massachusetts CBVE Curricula

Massachusetts CBVE curriculum materials or Learning Guides are composed of four major components:

- task listings;
- objectives;
- learning activities; and
- criterion-referenced tests.

Since an understanding of these components is helpful in understanding the findings of this study, the elements of each component are described briefly below.

Task Listings. A task listing is an outline of the skills that students must be able to perform for entry-level employment in a specific vocational area. Task listings consist of "duties", which are the broad areas of job responsibilities that a worker must

Exhibit 1.1

Status of Development and Dissemination of Massachusetts Competency-Based Vocational Education (CBVE) Learning Guides

Curriculum Area	School Year of Grant for Development	Date of Dissemination
Hotel and lodging	1982-83	January 1986
Food management, production and services	1982-83	March 1985
Electronics technology	1982-83	January 1987
Machine technology	1982-83	January 1986
Auto mechanics	1983-84	January 1986
General merchandising	1983-84	January 1986
Computer technology	1983-84	March 1985
Child development assistant	1983-84	January 1987
Health assistant I	1983-84	March 1985
Ornamental horticulture	1983-84	March 1985
Health assistant II	1985-86	February 1989
Metal fabrication	1984-85, 1985-86	February 1989
Small business management	1984-85	*
Drafting	1984-85	January 1987
Auto body repair	1984-85, 1985-86	February 1989

continued

Exhibit 1.1
(continued)

Status of Development and Dissemination of Massachusetts
Competency-Based Vocational Education (CBVE)
Learning Guides

Curriculum Area	School Year of Grant for Development	Date of Dissemination
Carpentry	1984-85	February 1989
Medical assistant	1984-85	January 1986
Electrical technology	1984-85	January 1986
Plumbing and pipefitting	1985-86	February 1989
Heating, ventilation, air conditioning and refrigeration	1985-86	February 1989
Graphic arts	1985-86	February 1989
Accounting and computing	1986-87	February 1989
Finance and credit	1986-87	February 1989
Painting and decorating	1986-87	February 1989
Commercial art	1987-88, 1988-89	*
Electromechanical service technician	1987-88, 1988-89	*
Fashion design	1987-88, 1988-89	*

Source: Competency-Based Vocational Education: Status report of Leadership Project. (January, 1989). Tyngsboro, MA: Greater Lowell Regional Vocational-Technical School District.

*Not yet disseminated

Exhibit 1.2

Status of Dissemination of Massachusetts Math/Science Competencies

Curriculum Area	Date of Dissemination
Computer technology	January 1986
Food management, production and services	January 1986
Health assistant	January 1986
Ornamental horticulture	January 1986
Hotel and lodging	January 1987
General merchandising	January 1987
Electrical technology	January 1987
Auto mechanics	January 1987
Medical assistant	January 1987
Auto body repair	February 1989
Carpentry	February 1989
Child development assistant	February 1989
Drafting	February 1989
Electronics	February 1989
Graphic arts	February 1989
Health assistant	February 1989
Heating, ventilation, air conditioning and refrigeration	February 1989
Metal fabrication	February 1989
Vocational applications of math concepts	February 1989
Vocational applications of physical science concepts	February 1989

Source: Competency-Based Vocational Education: Status report of Leadership Project. (January, 1989). Tyngsboro, MA: Greater Lowell Regional Vocational-Technical School District.

perform (e.g., servicing tires) and "tasks" or specific activities leading to a completed service or product (e.g., rotate tires, change tire on rims, balance tires). Together, the tasks and duties fully describe the occupation and provide a master plan for a specific vocational curriculum.

Objectives. There are two types of objectives specified in the Massachusetts CBVE Learning Guides: performance objectives and enabling objectives. The performance objectives identify what students must do in order to achieve mastery of a task. In the Massachusetts CBVE Learning Guides, performance objectives are written in the following format:

Given ...	[a set of conditions, equipment, etc.]
You Will...	[perform a specific task]
How Well ...	[according to specified standards or test score]

A performance objective is written for each task in the CBVE Learning Guide.

Enabling objectives are the subtasks or steps necessary to perform a specific task. For example, for the task in the auto mechanics CBVE Learning Guide for lubricating a chassis, the five enabling objectives are:

1. Identify types of chassis lube and lube points.
2. Locate and clean all chassis lubrication points.
3. Lubricate chassis fittings.
4. Lubricate door and hood hinges.
5. Install door sticker and clean vehicle.

Together, the performance objectives and the enabling objectives identify the specific capabilities to be mastered and provide the framework for the instructional sequences necessary for students to learn the desired tasks (Popham, 1975).

Learning Activities. The learning activities specify the steps that a student should take in order to master a specific task. For each enabling objective, there is a learning activity sheet that states the enabling objective and lists specific student activities along with the corresponding resources. For example, students might be directed to read parts of a text or other instructional materials, attend an instructor's demonstration, practice activities and evaluate their knowledge by taking practice tests called self-checks. Resources can include outside references, such as textbooks identified on the learning activity, or instruction sheets included in the Learning Guide. Together, these activities form the basis for self-paced student learning.

Tests. In competency-based instruction, student performance is assessed through criterion-referenced tests rather than norm-referenced tests. While norm-referenced tests base students' scores on their relative standing to other test-takers, criterion-referenced tests examine students' performance or knowledge in relation to a specific set of behaviors or skills. In this way, criterion-referenced tests measure what students know or can do; mastery is based on meeting the specified criteria.

There are two types of tests in the Massachusetts CBVE Learning Guides: knowledge tests and performance tests. Knowledge tests include multiple-choice tests, fill-in-the-blanks, and other common forms of paper-and-pencil tests. The performance tests consist of a list of criteria or steps necessary to performing a specific task in the Learning Guide. Students have access to the performance tests from the outset of the task, so that there is a concrete reminder of what is necessary to attain proficiency in an area. When students feel that they have mastered the requisite skills, they can choose to take the knowledge and performance tests.

Organization of this Report

This report synthesizes information about CBVE from multiple research methodologies. The research methodologies used to gather information for this study are described in Chapter II. The remainder of the report discusses the findings of the study. Chapter III presents the results of a mail survey about CBVE sent to administrators in school districts across the state. Chapter IV describes the process of developing and disseminating the Massachusetts CBVE Learning Guides. Chapter V discusses the quality of the CBVE curriculum materials based on a review by AAI staff of ten CBVE Learning Guides and interviews with vocational teachers and administrators familiar with the Massachusetts CBVE materials. Chapter VI summarizes the ways in which the Massachusetts CBVE materials are used in a sample of ten school districts, and discusses the factors that facilitate or impede implementation. The final chapter draws together the key findings from the study and presents recommendations for future steps of the CBVE project in Massachusetts.

CHAPTER II

DESIGN OF THE STUDY

Information for this study was collected from multiple perspectives through a variety of research methodologies, including:

- a statewide mail survey to district administrators;
- a review of CBVE curriculum materials;
- interviews with Division of Occupational Education staff, both in the central office and the regional education centers;
- visits to Massachusetts Vocational Curriculum Resource Center (MVCRC) to review materials and interview staff;
- interviews with members of the State Leadership Team; and
- site visits to ten school districts across the state.

This chapter briefly describes each of these methodologies.

Statewide Mail Survey

A brief mail survey was sent to the 108 districts with at least one vocational program approved and funded by the state under Chapter 74. The survey was directed to the district vocational administrator responsible for curriculum decisions. Survey questions inquired about administrators' awareness and familiarity with competency-based vocational education, in general, and about the use of the Massachusetts CBVE curriculum materials, in particular. A more detailed description of the survey content and procedures is included with the discussion of survey results in Chapter III of this report. A copy of the survey can be found in Appendix A.

Review of CBVE Curriculum Materials

Ten of the Massachusetts CBVE Learning Guides were reviewed by the project director and a senior AAI staff member with experience in classroom teaching and curriculum development. These CBVE curricula were selected to represent a range of vocational areas, including courses in trades and industry as well as other vocational areas. In addition, the ten curricula varied as to the date of their development, from the first CBVE project in 1982-83 through the fifth project in 1986-87.

Five of the ten curricula reviewed had been disseminated before the 1988-89 school year, and were chosen on the basis of the survey results to represent the CBVE Learning Guides used by the greatest number of school districts. These include:

- Auto mechanics;
- Drafting;
- Electronics technology;
- Food management, production and services; and
- Machine technology.

The other five curricula reviewed were disseminated during 1989, and include:

- Accounting and computing;
- Graphic arts;
- Health assistant;
- Metal fabrication; and
- Plumbing and pipefitting.

Where the corresponding Math/Science Competencies were available, these were perused. However, these materials are still in too early a stage of development for a meaningful review.

The ten CBVE Learning Guides were reviewed according to a set of criteria based on the Massachusetts training manual for developing CBVE materials as well as general guidelines for curriculum materials and student tests. These criteria are listed in Appendix B of this report. Using these criteria, the two AAI staff each reviewed sections of the CBVE Learning Guide for auto mechanics. Comments and findings were discussed to ensure a common understanding of the review criteria. Then, the remainder of the CBVE guides were reviewed by staff individually.

Results of this independent review of the quality of the CBVE Learning Guides are integrated with comments from teachers and administrators obtained during site visits to vocational schools (described below). In this way, the review of CBVE curriculum materials encompasses both theoretical and pragmatic considerations.

Interview with Division of Occupational Education Staff

At the outset of the study, the project director interviewed key staff at the Department of Education who were involved in the CBVE project. (The individuals interviewed are listed in Appendix C of this report.) These interviews focused on the history and development of the CBVE project and identified the types of information that would be useful to these state-level policymakers from this study. These information needs helped to guide the development of the statewide survey and the interview guides for the site visits.

Once the study was underway, the project director spoke with Occupational Education Team Leaders and their staff in four regional education centers. (The four centers visited are identified in Appendix C of this report.) These interviews lasted from one to two hours and covered a range of issues, such as the type of technical assistance about CBVE that staff offer or coordinate for schools in their region; their impressions of districts' reactions to CBVE; the level of district implementation of the CBVE Learning Guides; and their recommendations for future steps of the CBVE project.

Massachusetts Vocational Curriculum Resource Center

Since 1980, the state has funded the Massachusetts Vocational Curriculum Resource Center (MVCRC), located at Minuteman Regional Vocational-Technical School in Lexington. The overarching goal of the center has been "to provide curriculum resources to vocational educators statewide, and specifically to: collect and catalog curriculum resources; share information about the materials and services of the center; and assist the Division of Occupational Education with research, staff training, and dissemination" (Center for the Study of Testing, Evaluation and Educational Policy, 1986). The MVCRC houses a broad range of curriculum materials for vocational education, including copies of all of the Massachusetts CBVE Learning Guides and Math/Science Competencies. In addition, the center publishes a quarterly newsletter, entitled "Curriculum Currents", and offers technical assistance and professional development workshops focused on vocational curriculum materials.

Since the MVCRC is an important conduit of information about curriculum in vocational education, Abt staff members visited the center on several occasions during the course of this study to review curriculum materials, including Massachusetts CBVE Learning Guides and Math/Science Competencies as well as competency-based materials from other sources (e.g., Mid-America Vocational Curriculum Consortium, V-TECS, Oklahoma).

In addition, interviews were conducted with the director of the MVCRC and the superintendent-director of the school in which it is housed. These interviews focused on competency-based education, in general, and the Massachusetts CBVE, in particular.

Interviews with Members of the State Leadership Team

In addition to grants for the development of CBVE Learning Guides, the Division of Occupational Education also has awarded a contract to a State Leadership Team to provide technical assistance and professional development activities pertaining to the CBVE curriculum materials. Since 1984, this contract has been awarded to the Greater Lowell Regional Vocational-Technical School District.

The primary responsibilities of the State Leadership Team are to:

- design and conduct staff training for teachers who develop CBVE Learning Guides;
- edit the CBVE Learning Guides for technical and grammatical errors;
- print copies of the CBVE Learning Guides and the Math/Science Competencies;
- disseminate the CBVE curriculum materials;
- provide technical assistance to schools implementing CBVE curricula.

The State Leadership Team also is in charge of developing and distributing informational materials about CBVE to schools across the state. As part of this responsibility, they published a newsletter entitled, "Future Trends", which was devoted to information about competency-based vocational education. This newsletter was started in January of 1987; three editions were printed and distributed, but due to a lack of time and resources, the last edition was distributed in December of 1987.

In addition to staff at Greater Lowell, in fiscal year 1989, the Division of Occupational Education awarded funds to Cape Cod Regional Vocational-Technical School and to Pathfinder Vocational-Technical School for their staff to provide technical assistance to teachers implementing CBVE curricula. These teachers have led implementation workshops for individual school districts and in coordination with regional centers. In addition, they are involved in putting CBVE Learning Guides onto computers to facilitate revisions and access.

As part of this study, the project director and one senior staff member interviewed the three members of the State Leadership Team at Greater Lowell Regional Vocational-Technical School and reviewed the newsletter and other promotional materials. In addition, the two new members of the State Leadership Team from Pathfinder and Cape Cod Regional Vocational-Technical Schools were interviewed for this study. (The specific individuals interviewed are listed in Appendix C of this report.)

Site Visits to School Districts

In order to obtain information about the use of CBVE in vocational classrooms, AAI staff visited ten school districts in Massachusetts during April and May of 1989. During these site visits, interviews were conducted with classroom teachers as well as administrators, such as the director of occupational education, the assistant superintendent for vocational education, or the superintendent-director. The interviews focused on the ways in which the Massachusetts CBVE Learning Guides are used in vocational classrooms, the process of developing Massachusetts CBVE curriculum materials, and a comparison of Massachusetts CBVE materials with those available from other states and curriculum organizations.

Selection of Districts

The ten districts were selected after the mail survey had been completed, based on six criteria:

- Type of district. Teachers would be interviewed from regional vocational-technical schools as well as from comprehensive school districts offering five or more Chapter 74 programs.
- Involved in development of Massachusetts CBVE. In order to find out about the process of creating CBVE materials using the Massachusetts model, a subset of the schools should have been involved in developing Massachusetts CBVE Learning Guides.
- Region of the state. The schools visited should represent all six regions of the state.
- Prevalence of Massachusetts CBVE Materials. Based on the survey results, we considered the ratio of the Massachusetts CBVE Learning Guides being used out of the number of courses offered in which there are CBVE materials available. For the ten schools selected, we wanted to include schools where Massachusetts CBVE materials are used in most available vocational areas, as well as schools that use the CBVE materials in only a portion of their courses. In the latter case, we would talk with teachers who use Massachusetts CBVE

materials and teachers who have chosen not to implement these curriculum materials.

- Use of CBVE materials other than Massachusetts CBVE. A number of schools indicated that they used Massachusetts CBVE materials in combination with competency-based materials from other states or organizations. In addition, a number of schools have developed their own CBVE curricula. In order to explore the advantages and disadvantages of the Massachusetts CBVE Learning Guides, we wanted to include at least some districts that have chosen to use other types of CBVE materials in vocational classrooms.
- Use of Math/Science Competencies. We wanted to include districts that indicated on the survey that they use the Math/Science Competencies in at least one vocational area.

Based on these criteria, we selected ten districts and five alternates. Letters describing the purpose of the site visits were sent to the vocational contact in the ten districts. The letters were followed up by a telephone call to schedule the site visits. Three districts declined to participate because of time constraints, such as grant deadlines, a Chapter 74 audit and a move to a new building. Letters were sent to three alternate sites in the same or adjacent region of the state.

The ten districts that participated in the site visits are listed below:

- Assabet Valley Regional Vocational-Technical School District;
- Baypath Regional Vocational-Technical School District;
- Blue Hills Regional Vocational-Technical School District;
- Brockton Public Schools;
- Cape Cod Regional Vocational-Technical School District;
- Greater Lawrence Regional Vocational-Technical School District;
- Nashoba Valley Regional Vocational-Technical School District;
- Newton Public Schools;
- Pathfinder Regional Vocational-Technical School District; and
- Westfield Public Schools.

Exhibit 2.1 summarizes the characteristics of the ten participating districts in terms of the selection criteria.

Exhibit 2.1

Characteristics of Ten Districts Selected for Site Visits

Characteristic	Number of Districts
Type of District	
Regional Vocational-Technical	7
Comprehensive	3
Region of the State	
Northeast	2
Greater Boston	2
Southeast	2
Central	2
Greater Springfield	2
Involved in CBVE Development	6
Type of CBVE Used in District	
Massachusetts CBVE	9
District CBVE	9
Other types of CBVE	7
Use Math/Science Competencies	4

Interviews with Teachers and Administrators

The interviews generally were conducted with staff on an individual basis and lasted from 20 to 40 minutes. Interview guides were developed that outlined the major topics to be covered and listed probes for further information from three groups of respondents: vocational teachers using the Massachusetts CBVE materials and/or other types of competency-based curricula; teachers involved in developing the Massachusetts CBVE Learning Guides; and administrators. If time permitted, teachers involved in developing CBVE materials also were asked the questions about their use of these materials. Copies of these three interview guides are included in Appendix D of this report.

The site visits were conducted by three senior AAI staff: the project director and two staff members with case study experience in educational settings. For the first two site visits, the project director conducted the interviews with one of the other staff members in order to ensure a common understanding of the intent and procedures of the interviews. The remaining site visits were conducted by a single staff member who spent most or all of a school day at the vocational school.

In each school, we spoke with one or two administrators and four to six vocational teachers. Across the sites, a total of 14 administrators and 47 teachers were interviewed. In addition, in one site a group discussion was held with ninth grade students using the Massachusetts CBVE Learning Guides. In all sites, AAI staff had the opportunity to visit vocational classrooms and shops and view the facilities available to students.

CHAPTER III

STATEWIDE SURVEY OF COMPETENCY-BASED VOCATIONAL EDUCATION

This chapter presents the results of a statewide survey mailed to all school districts in Massachusetts that have vocational education programs approved and funded by the state through Chapter 74. The chapter begins with a discussion of the purpose and content of the survey, followed by sections describing the survey procedures and the sample of respondents. The remainder of the chapter presents the findings from the survey. Results first are summarized across all districts in the state; then differences in the knowledge and use of CBVE are described in terms of three district characteristics: region of the state, type of school district (i.e., regional vocational-technical school or comprehensive district), and number of Chapter 74 programs. The last section of the chapter summarizes the key survey findings.

Purpose of the Survey

A brief mail questionnaire was developed to investigate the knowledge and use of Competency-Based Vocational Education (CBVE) curriculum materials among administrators in Massachusetts school districts. The survey was designed to provide information about competency-based vocational education as a general concept as well as about the specifics of the CBVE materials developed in Massachusetts. A copy of the survey is provided in Appendix A of this report.

The first section of the survey focused on the general level of awareness of CBVE, beginning with a simple question asking whether the respondent had ever heard of competency-based vocational education. Follow-up questions explored the level of knowledge about CBVE, the avenues through which information had been received, and the extent to which CBVE curriculum materials had been reviewed.

The second section of the survey focused on the use of CBVE curriculum materials in vocational classes within the district. Questions examined the type of CBVE materials used, including the Massachusetts CBVE Learning Guides and competency-based materials developed by school district staff, other states and curriculum organizations. These questions were included to determine the extent to which the Massachusetts CBVE materials were accessed by school districts. Use of CBVE materials was broadly defined to include both implementation and adaptation of the curricula as references or resources.

In addition to questions about the type of CBVE materials used, the survey also inquired about the reasons for the choice of each type of competency-based curriculum material. These questions were included to examine the factors involved in the decision to utilize the Massachusetts CBVE materials as well as to explore why some school districts may have opted not to use the Massachusetts CBVE Learning Guides.

District staff also were asked to describe the strengths and limitations of the Massachusetts CBVE Learning Guides. In addition, the survey included questions about the use of Math/Science Competencies in vocational and academic classes, and whether Massachusetts CBVE materials had ever been used and discontinued in the district.

Thus, the survey began with general questions about awareness of competency-based vocational education and moved to more specific details about implementation of CBVE curriculum materials and the reasons for curriculum choices. However, it is important to keep in mind that, for a number of reasons, the survey only provides a broad-brush picture of the use of CBVE materials. First, the survey was intended to represent administrators' perceptions of CBVE. Administrators are the first point of contact between the Department of Education and vocational teachers, and, thus, are a critical link in any curriculum reform effort. However, they may not be aware of the exact ways in which CBVE materials are used in the classroom. Furthermore, individual teachers within the district are likely to differ in their use of CBVE materials, variation that the survey was not designed to capture.

Another limitation regarding interpretation of the survey results is that the survey intentionally provided a broad definition of the use of CBVE materials, which included utilization of the materials as a reference as well as a resource for teaching. Thus, survey results do not differentiate between districts using the CBVE Learning Guides as individually-paced learning activities and districts using the CBVE materials as occasional teacher references.

These limitations are addressed by the case study methodology, through interviews with vocational teachers. Teachers' descriptions of the ways in which they use competency-based curriculum materials are presented in Chapter VI of this report.

Survey Procedures

This section discusses the process of developing the survey instrument and the procedures employed in the conduct of the survey. In the following section, the response rate and characteristics of respondents are described.

Development of Survey Instrument

A draft of the survey instrument was designed by staff at Abt Associates, based on conversations with key individuals in the Division of Occupational Education about the information they would like to obtain from the study and their suggestions for survey questions. The draft survey was reviewed by several Occupational Education staff in the Bureau of Research, Planning and Evaluation and revised to incorporate their suggestions.

The revised draft was then reviewed by vocational administrators in two districts in different parts of the state. AAI staff contacted these administrators because they had participated in a previous AAI study of vocational education. They were asked to complete the survey and comment on the clarity of the questions and the directions. Based on their comments, the survey was revised again. The final form of the survey was approved by Occupational Education staff.

Survey Mail-Out Procedures

The survey was mailed in early February, 1989 to 108 school districts in Massachusetts that have at least one Chapter 74 program. These districts were identified in the 1988 edition of the Directory of Massachusetts Vocational Schools and Programs Offered, published by the Division of Occupational Education in the Massachusetts Department of Education.

The survey was mailed directly from AAI with a cover letter from Dr. David Cronin, Associate Commissioner, Division of Occupational Education. The letter explained the purpose of the survey, identified AAI as authorized to conduct the study and encouraged districts to complete the questionnaire. The cover of the survey and a brief set of directions also informed respondents about the purpose of the questionnaire, stressed that participation was voluntary, and assured district personnel that all responses would be kept strictly confidential.

The survey was mailed to the vocational contact identified in the Directory of Massachusetts Vocational Schools and Programs Offered. For regional vocational-technical schools, the contact generally was the superintendent-director. For comprehensive school districts (i.e., districts offering a full-range of academic courses in addition to vocational courses), the contact was either the director or coordinator of vocational/occupational education or the district superintendent. The survey directions

indicated that the survey should be completed by the director of vocational or occupation education, if there was such a position in the district. Otherwise, the survey should be forwarded to the administrator or supervisor most responsible for curriculum decisions.

Respondents were given approximately three weeks to complete the survey. Postage-paid envelopes were provided, so that respondents could return the completed surveys directly to AAI.

Follow-up Procedures

One week after the initial mailing, a reminder postcard was sent to all districts included in the survey. This postcard served multiple purposes. First, it informed districts that a survey had been mailed to them; if they had not received the survey or had misplaced it, they were directed to call AAI and another survey would be mailed. Second, the postcard encouraged the person who received the survey to forward it, if necessary, to the appropriate individual to complete. Third, the postcard restated the deadline and provided a gentle reminder to complete the survey.

Two weeks after the deadline for returning the survey, all non-responding districts were called by AAI staff to ask a subset of the survey questions over the telephone. These questions focused on general awareness of CBVE and use of the Massachusetts Learning Guides, but did not include the more narrative questions about the reasons for choosing a particular type of competency-based curriculum or the advantages and disadvantages of the Massachusetts materials. At least two attempts were made to contact each district.

Description of Survey Respondents

Response Rate

Completed surveys were received in the mail from 79 school districts. In addition, surveys were returned from three districts that indicated they no longer offered any Chapter 74 programs. Thus, the eligible universe of districts offering at least one Chapter 74 program during the 1987-88 school year was really 105 rather than 108 districts. Based on this adjustment, the mail survey resulted in a response rate of 75.2% (79/105 districts).

Telephone calls made to the 26 non-responding districts gathered information on a subset of questions from administrators in 12 districts. Adding these 12 telephone

respondents to the mail surveys yields an overall response rate of 86.7% (91/105 districts), and survey information available from 91 schools districts.

Characteristics of Survey Respondents and Potential Response Bias

As expected, the majority of surveys were completed either by the superintendent/superintendent-director (22%) or by the director or coordinator of vocational/occupational education (45%). Nine percent of the surveys were filled out by an assistant superintendent/superintendent-director, while 7% were completed by a department head. Only 4% of the surveys were completed by a curriculum coordinator, 2% by a high school principal and 3% by an assistant principal. Seven percent of the surveys were completed by other staff in the district, such as guidance counselor, coordinator of cooperative education, or CBVE coordinator.

An overall response rate of 87% is high enough to minimize the possibility that survey respondents represent a skewed sample of all districts in the state with Chapter 74 programs. Nevertheless, it is important to look at the characteristics of survey respondents in order to rule out potential response bias.

Exhibit 3.1 describes the 91 districts that responded to the survey in terms of the region of the state in which they are located, the type of district and the number of Chapter 74 programs. This information is presented as percentages within the sample (e.g., proportion of the sample from each region) as well as percentages of all eligible districts (e.g., the proportion of districts in that region with Chapter 74 programs).

One quarter of the districts responding to the survey are in the northeast region of the state; 28% are in the southeast region; 19% of the participating districts are in central Massachusetts; and 15% are in the Greater Boston area. Less than 10% of the respondents are from districts in the Greater Springfield or northwest regions of the state.

Since the regional breakdown of survey respondents generally reflects the relative size of each region, the response rates across regions do not differ widely. In the Greater Boston, northeast, southeast and central regions, the survey response rate was between 82% and 90%. In the northwest region, the response rate was somewhat lower (67%); however, there are so few districts with Chapter 74 programs in that region, that this seemingly low response rate corresponds to receiving completed surveys from four of the six eligible districts. All of the districts with Chapter 74 programs in the Greater Springfield region completed the survey.

Exhibit 3.1
Characteristics of Survey Respondents

District Characteristic	Percent of all Respondents (n) ^a	Percent of Eligible Districts ^b
Region of State		
Greater Boston	15.4% (14)	82.4
Northeast	25.3 (23)	85.2
Central	18.7 (17)	89.5
Southeast	27.5 (25)	89.3
Greater Springfield	8.8 (8)	100.0
Northwest	4.4 (4)	66.7
Type of District		
Comprehensive	73.6 (67)	88.2
Regional Vocational-Technical	26.4 (24)	82.8
Number of Chapter 74 Programs		
1-4	43.9 (40)	85.1
5-9	15.4 (14)	77.8
10-14	17.6 (16)	88.9
15-19	12.1 (11)	91.7
20-24	6.6 (6)	100.0
25-29	3.3 (3)	100.0
30-34	1.1 (1)	100.0

^aPercentages are based on 91 districts completing survey.

^bEligible districts refer to the 105 districts with at least one Chapter 74 program.

Seventy-four percent or 67 of the districts responding to the survey are comprehensive districts, which offer a full range of academic courses in addition to vocational/occupational courses. Twenty-six percent or 24 of the districts completing the survey are regional vocational-technical schools. These figures correspond to a response rate of 88% for comprehensive districts and 83% for regional vocational-technical schools.

More than 40% of the survey respondents are from districts offering fewer than five Chapter 74 programs. This figure represents an 85% response rate among this group of districts. Approximately 15% of the responding districts offer between five and ten Chapter 74 programs; 18% offer ten to fourteen vocational programs; and 12% offer fifteen to nineteen programs. The response rate among each of these three groups ranged from 78% to 92%. Eleven percent or 10 of the responding districts offer 20 or more Chapter 74 programs, which represents a 100% response rate among this group of districts with large vocational/occupational programs.

Taken together, this information about the characteristics of the responding districts does not reveal wide variations in the response rates among different types of districts. Where variations exist, they are often a function of small numbers within that demographic category. Thus, as the overall high response rate would suggest, there does not seem to be any reason to suspect response bias in the survey results. In other words, the results from the 91 survey respondents can be generalized to all districts in the state offering Chapter 74 programs.

Survey Results

This section presents the results from the mail survey. Results are first described for the state as a whole, and then differences are discussed across regions of the state, types of district (i.e., regional vocational-technical versus comprehensive), and number of Chapter 74 programs.

The number of Chapter 74 programs was taken from the 1989 edition of the Directory of Massachusetts Vocational Schools and Programs Offered, published by the Division of Occupational Education in the Massachusetts Department of Education. For analysis purposes, the number of Chapter 74 programs was divided into the categories used by the Division of Occupational Education in their outreach to schools: districts with one to four Chapter 74 programs and districts with five or more Chapter 74 programs. Of course, type of school and number of Chapter 74 programs are interrelated, since all regional vocational-technical schools have more than five Chapter

74 programs. However, we felt that it was important to analyze the survey results from both perspectives, in order to explore whether the differences in the administrative structure and the type of vocational delivery system (i.e., type of district) as well as the number of vocational programs affect the knowledge and use of CBVE.

Differences among districts in the six regions of the state are examined, although in many instances disaggregating the relatively small number of respondents into six categories preclude finding any meaningful differences.

The discussion of survey results is divided into four subsections: knowledge of CBVE; use of CBVE; types of CBVE used in the district and the reasons for these choices; and use of Math/Science Competencies.

Knowledge of Competency-Based Vocational Education

Administrators in 88% of school districts with Chapter 74 programs have heard of competency-based vocational education. (See Exhibit 3.2.) All of the administrators who indicated that they had never heard of CBVE work in comprehensive school districts with fewer than five Chapter 74 programs. There are no regional differences on this variable.

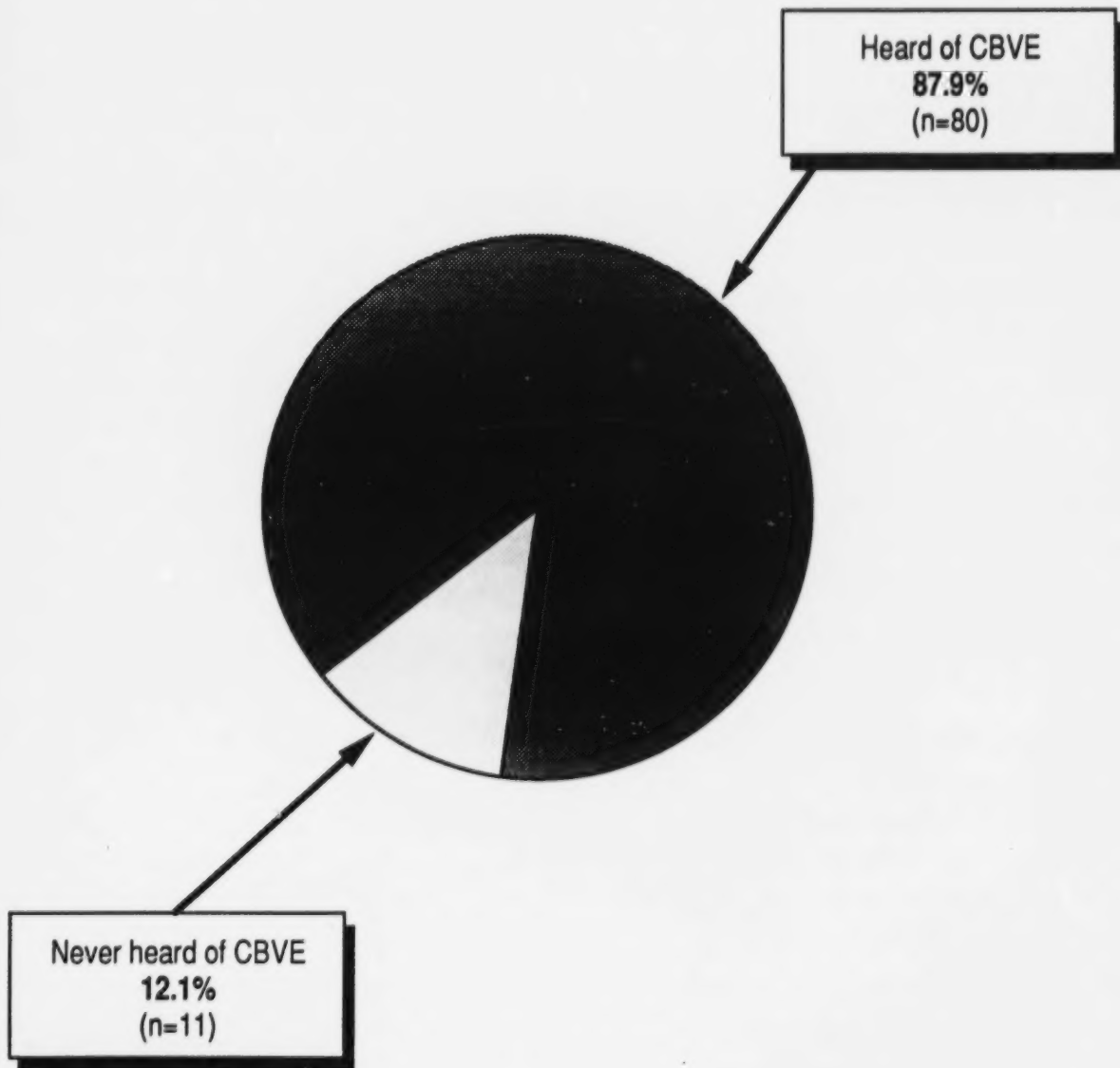
Familiarity with CBVE. As Exhibit 3.3 shows, the majority (74%) of district administrators are familiar with CBVE concepts and materials. In 11% of the districts, administrators indicated that they are aware of CBVE concepts, but have not seen CBVE curriculum materials. Only 1% of the respondents indicated that they had heard about CBVE, but did not know any specifics about it.

A larger percentage (91%) of administrators in regional vocational-technical schools are familiar with CBVE materials and concepts than staff in comprehensive districts (67%). Similarly, 89% of administrators in districts with five or more Chapter 74 programs indicated that they are familiar with CBVE concepts and materials, as compared with only 54% of administrators in districts with fewer than five Chapter 74 programs. There are minimal regional differences in the level of awareness about CBVE.

Avenues of Information about CBVE. The most common way that administrators have heard about CBVE is through publications or workshops from the Department of Education, the Massachusetts Vocational Curriculum Resource Center (MVCRC) or the State Leadership Team. As Exhibit 3.4 illustrates, 79% of the respondents who have heard about CBVE have learned about it from publications or newsletters from the Department or the MVCRC. In addition, 61% of these respondents

Exhibit 3.2

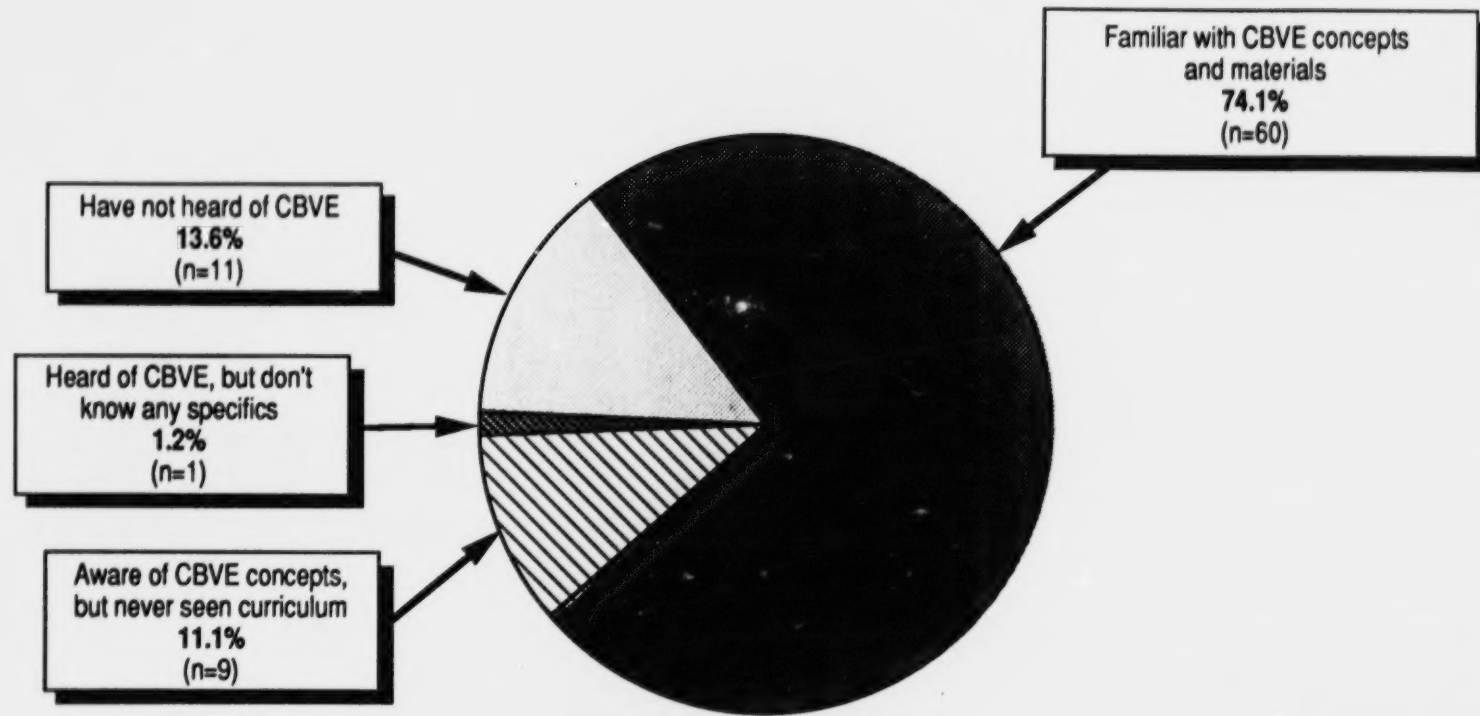
Knowledge Of Competency-Based Vocational Education (CBVE)



Note: Percentages are based on n of 91 districts responding to survey.

Exhibit 3.3

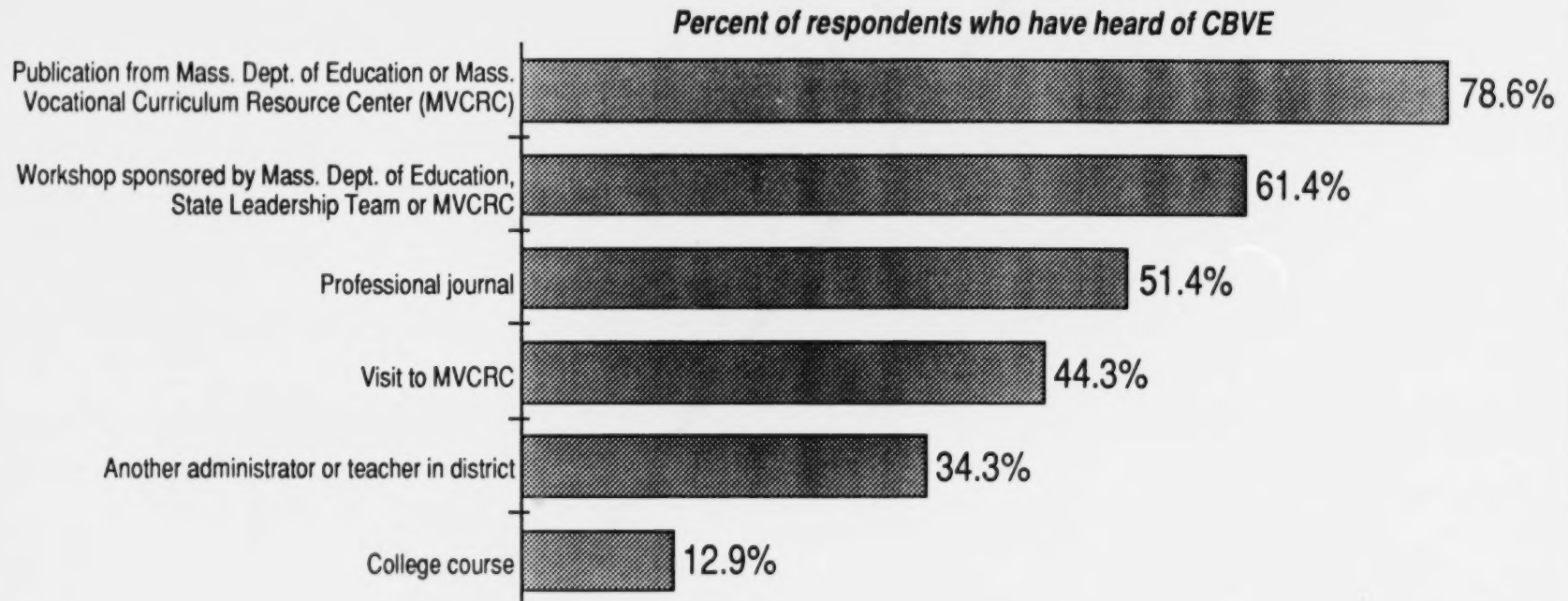
Familiarity With Competency-Based Vocational Education (CBVE)



Note: Percentages are based on 81 districts responding to mail survey; the 10 districts responding to the survey over the telephone were not asked this question.

Exhibit 3.4

How District Administrators Have Learned About Competency-Based Vocational Education (CBVE)



Note: Percentages are based on n of 70 of the 80 respondents who have heard of CBVE; the other 10 districts responded to the survey over the telephone and were not asked this question.

have learned about CBVE from workshops sponsored by the Department, the MVCRC or the State Leadership Team. Approximately half of these administrators have read about CBVE in professional journals, and 44% have seen these materials during visits to the MVCRC. More than one-third of respondents have learned about CBVE from colleagues in their school or district. Only 13% have learned about CBVE from college courses.

There are slight differences in the avenues of information about CBVE in schools with fewer than five Chapter 74 programs. For example, only 46% of respondents from districts with fewer than five Chapter 74 programs indicated that they have learned about CBVE from workshops sponsored or funded by the Department of Education; in contrast, 70% of respondents from districts with more than five Chapter 74 programs have learned about CBVE through these workshops. On the other hand, a larger proportion of districts with fewer than five Chapter 74 programs have learned about CBVE from a college course, as compared to districts with more Chapter 74 programs (25% versus 7%).

A greater proportion (57%) of respondents from regional vocational-technical schools indicated that they have learned about CBVE from colleagues in their district, as compared with only 23% of respondents in comprehensive districts. Thus, there seems to be more sharing of information about CBVE in regional vocational-technical schools than in comprehensive districts.

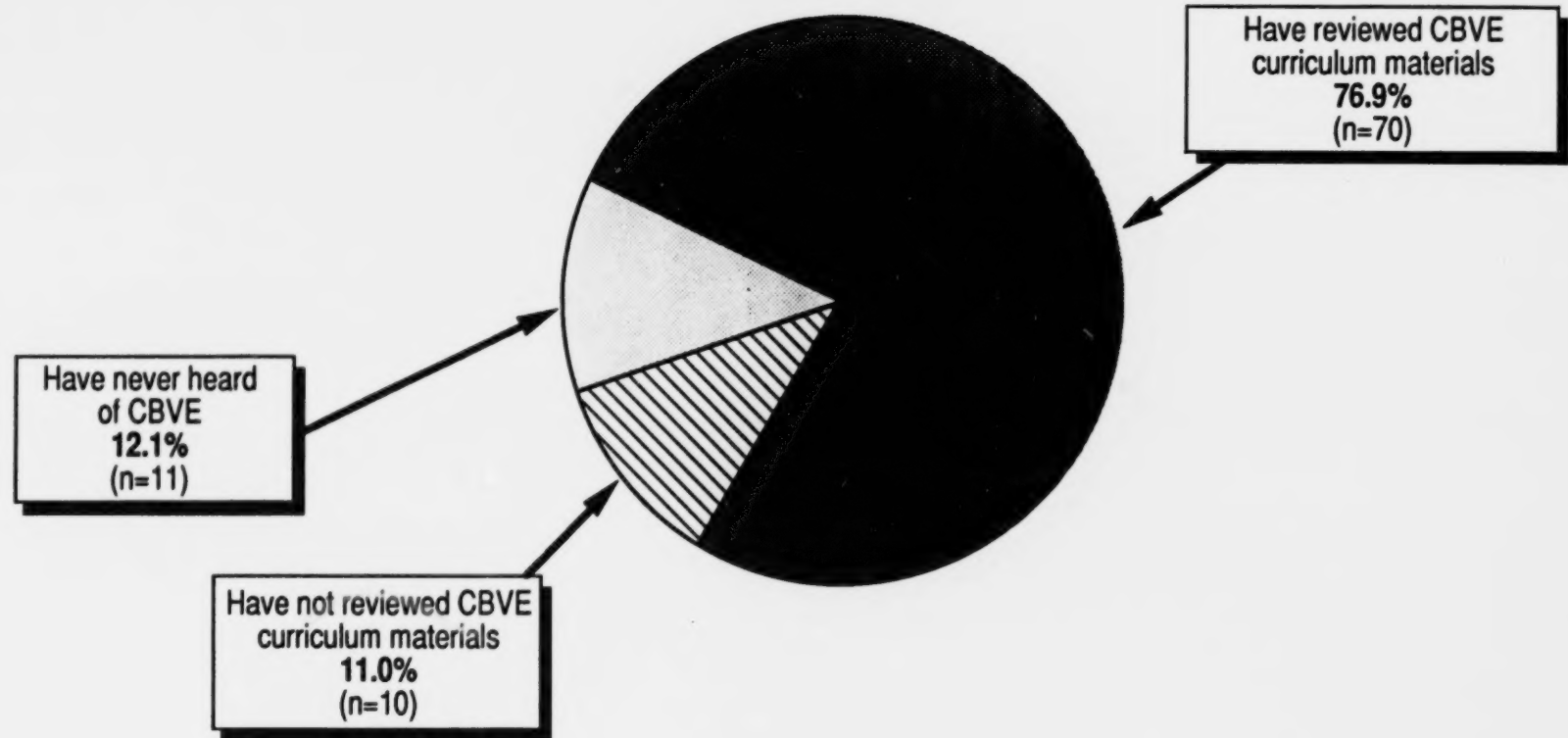
There are no regional differences in the ways that district administrators learn about CBVE.

Review of CBVE materials. The majority (77%) of administrators in the state have reviewed CBVE curriculum materials. (See Exhibit 3.5.) Exhibit 3.6 displays the type of CBVE curriculum materials that have been reviewed. Nearly all of the respondents (91%) who have reviewed CBVE materials have seen the Massachusetts CBVE Learning Guides, with about half indicating that they have reviewed competency-based materials developed by other states or curriculum organizations. Eleven percent of respondents have reviewed other types of competency-based curricula, such as those from curriculum publishers and professional/trade organizations.

All respondents from regional vocational-technical schools who have reviewed CBVE materials indicated that they have seen the Massachusetts materials. There are no regional differences in the proportion of districts that have reviewed the Massachusetts CBVE materials. However, a smaller proportion (78%) of the administrators from districts with fewer than five Chapter 74 programs have seen the Massachusetts CBVE

Exhibit 3.5

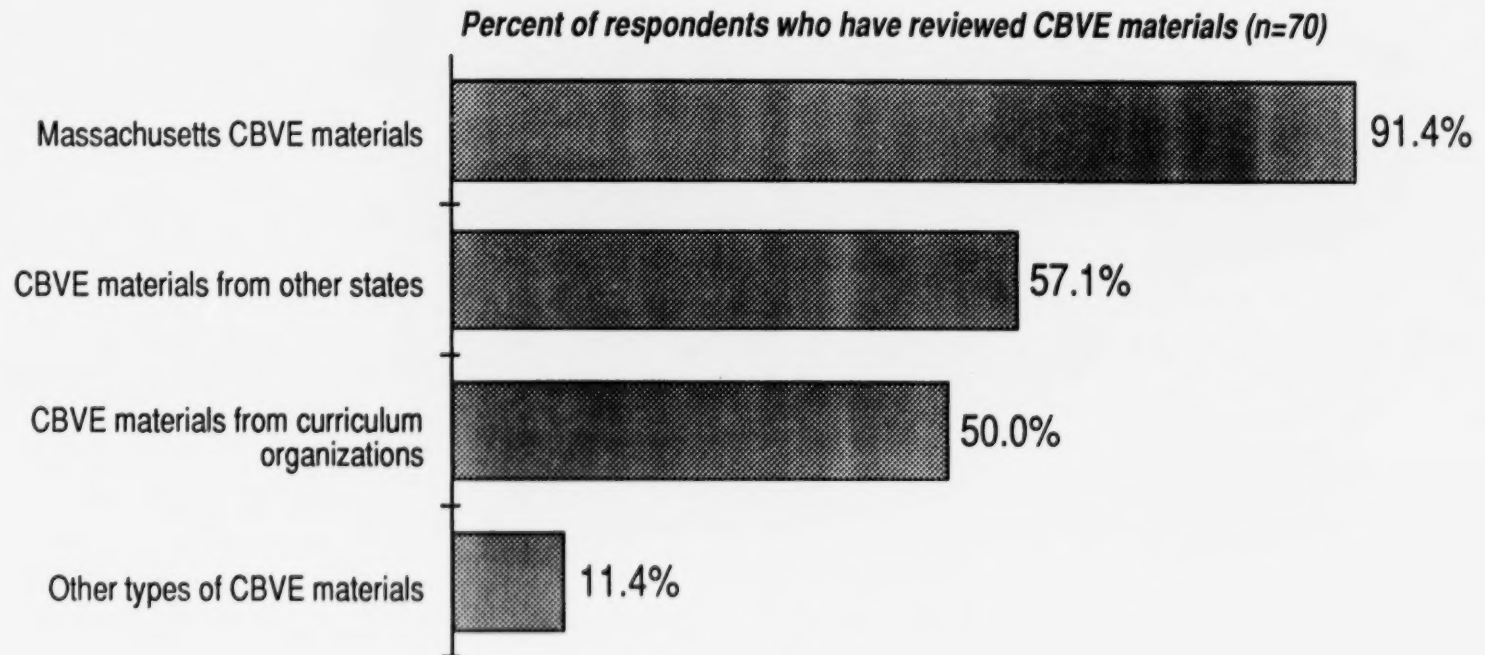
Percentage of District Administrators Who Have Reviewed Some Type of Competency-Based Vocational Education (CBVE) Curriculum Materials



Note: Percentages are based on n of 91 districts responding to survey.

Exhibit 3.6

Types of Competency-Based Vocational Education (CBVE) Materials District Administrators Have Reviewed



Learning Guides, as compared with administrators from districts with more than five vocational education programs (98%).

The two most likely places for administrators to have reviewed Massachusetts CBVE Learning Guides are the Massachusetts Vocational Curriculum Resource Center (MVCRC) in Lexington or at conferences or workshops. As Exhibit 3.7 shows, 73% of respondents who have reviewed Massachusetts CBVE materials have done so at the MVCRC, while 62% have seen the materials at workshops or conferences. Approximately 43% of these respondents have seen the Massachusetts CBVE materials at a curriculum library within their district. Less than 10% have seen Massachusetts CBVE materials in college classes.

The MVCRC and workshops or conferences also are the most likely places for administrators to have reviewed competency-based materials developed by other states or organizations. As Exhibit 3.7 shows, 53% of administrators who have reviewed other types of CBVE materials indicated that they saw them at workshops or conferences, while 43% have reviewed them at the MVCRC. A curriculum library in their school or district was cited by 28% of these respondents as the place where they reviewed other types of competency-based curriculum materials. However, it is important to keep in mind that these percentages are based on a small number of respondents ($n = 36$) who have reviewed other types of CBVE materials. Other ways in which administrators have been able to review competency-based materials include publishers' samples, professional organizations (e.g., DECA), and at national conventions (e.g., AVA).

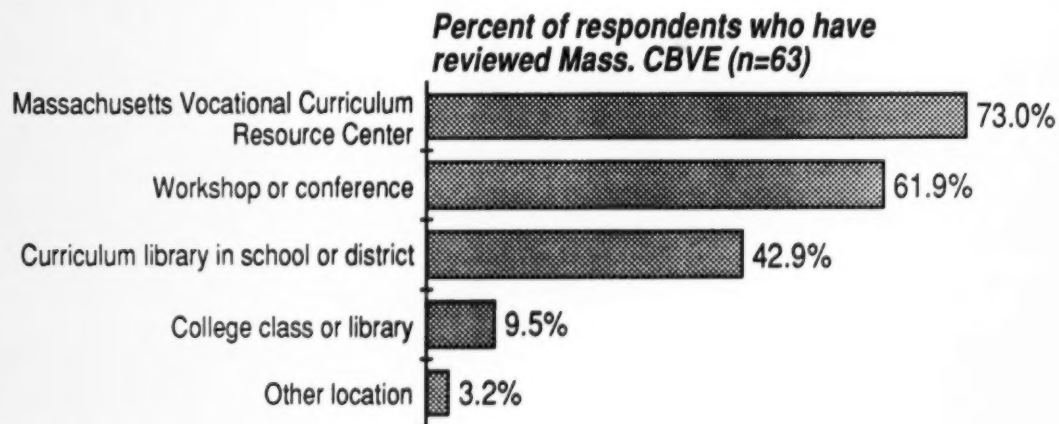
The proportion of respondents who have reviewed the Massachusetts CBVE materials at the MVCRC is similar in comprehensive districts (71%) and regional vocational-technical schools (76%), as well in districts with fewer than five Chapter 74 programs (65%) and districts with five or more Chapter 74 programs (77%). However, only 40% of districts with fewer than five Chapter 74 programs have seen the Massachusetts CBVE materials at workshops or conferences, compared with 72% of districts with five or more Chapter 74 programs.

In addition, a much smaller percentage of administrators in districts with fewer than five Chapter 74 programs have reviewed Massachusetts CBVE materials in a curriculum library within their district, as compared with administrators in districts with more Chapter 74 programs (10% versus 58%). Similarly, administrators in comprehensive districts are less likely to have reviewed Massachusetts CBVE materials in a curriculum library in the district than are administrators in a regional vocational-technical school (29% versus 71%). Of course, these results might simply mean that districts with more

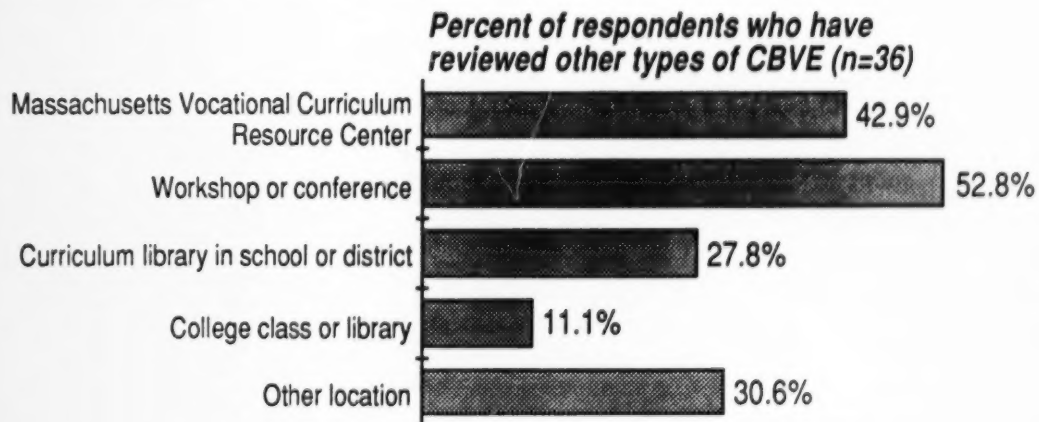
Exhibit 3.7

Where District Administrators Have Reviewed Competency-Based Vocational Education (CBVE) Curriculum Materials

Massachusetts CBVE Curricula



Other types of CBVE Curricula



than five Chapter 74 programs or regional vocational-technical schools are more likely to have a curriculum library.

The number of respondents that has reviewed other types of CBVE materials is too small to analyze the location by type of district, number of Chapter 74 programs or region of the state.

As Exhibit 3.5 illustrated, administrators in only 11% of districts have not reviewed any type of CBVE materials. This percentage corresponds to only ten survey respondents. Of this small group, five respondents reported a reason why they have never reviewed CBVE curriculum materials. Two respondents from comprehensive school districts in the northeast region of the state indicated that they did not know where these materials were available. One district offers four Chapter 74 programs and the other offers five Chapter 74 programs; neither district uses any type of CBVE materials in their vocational classes. One respondent from a comprehensive school district indicated that there was no time available to review CBVE curriculum materials. Two respondents from regional vocational-technical schools indicated that they were not interested in this approach to curriculum, with one respondent adding that he felt all vocational education was already competency-based.

Use of Competency-Based Vocational Education Curricula

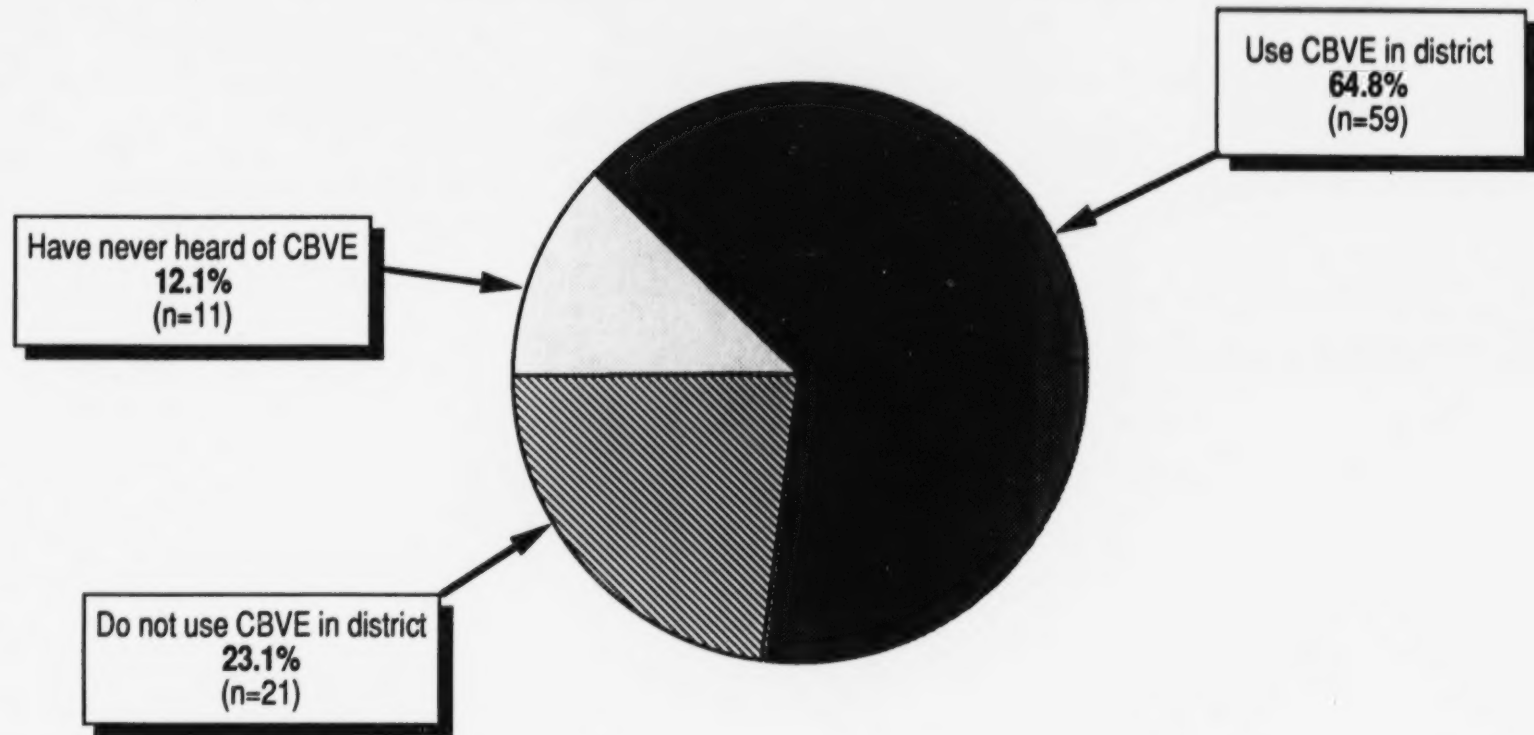
Among districts with Chapter 74 programs, 65% currently use some type of competency-based curriculum material in their vocational classes. (See Exhibit 3.8.) As discussed at the outset of this chapter, "use" was defined broadly on the survey to include use or adaptation of materials as references or resources.

The use of CBVE curriculum materials is strongly related to the number of Chapter 74 programs in the district. For example, only 38% of districts with fewer than five Chapter 74 programs use any type of CBVE curriculum materials, compared with 86% of districts with more than five Chapter 74 programs. The type of school district also is related to using CBVE, since the proportion of regional vocational-technical schools (88%) using CBVE materials is somewhat higher than the proportion of comprehensive districts (57%) using these curriculum materials. There are virtually no regional differences in the proportion of districts using some type of CBVE curriculum material in vocational classes.

As seen in Exhibit 3.8, 21 districts have heard of CBVE but are not currently using any type of competency-based curriculum materials. Among this group, 16

Exhibit 3.8

Percentage of Districts Using Any Type of Competency-Based Vocational Education (CBVE) Curriculum Materials



Note: Percentages are based on n of 91 districts responding to survey.

districts (76%) have considered this type of curriculum. When asked why they have decided against CBVE, respondents cited factors such as lack of funds to buy the CBVE materials, costs constraints in general, and disinterest in changing present curricula. The small number of respondents to these questions preclude any analyses by district descriptor variables.

The survey also inquired about the types of additional information or support that might facilitate implementation of CBVE among districts not currently using these materials. The three most common requests among the 11 districts responding to this question were: additional technical assistance in using the curriculum (8/11 or 73%), additional information about the curriculum (7/11 or 64%), and additional funds for materials or equipment (7/11 or 64%).

Only four districts have discontinued the use of CBVE curriculum materials. One district reported that the Massachusetts CBVE curriculum for auto mechanics had been discontinued just after it was implemented because of lack of knowledge about implementation, a change in teaching personnel and difficulty adapting the materials to fit their equipment/supplies; however, the respondent indicated that the district will try again next year. Another district discontinued the Massachusetts CBVE auto mechanics curriculum because teachers preferred the competency-based materials developed by Oklahoma. One district has discontinued use of all Massachusetts CBVE materials because of difficulty adapting the materials to their own equipment/supplies and the amount of paperwork involved. The fourth district discontinued use of CBVE after a change in teaching personnel.

Types of Competency-Based Vocational Curriculum Used

As Exhibit 3.8 illustrated, 59 districts (65% of districts with Chapter 74 programs) use some type of competency-based curriculum materials in vocational classes. This section presents information about the types of materials used by these districts.

The survey inquired about the use of the Massachusetts CBVE Learning Guides, competency-based materials developed by the district, and materials available from other states and organizations. Respondents were able to "check all that apply", since there is likely to be more than one type of competency-based curriculum used in a district. This section begins by presenting the prevalence of use of each type of curriculum, then discusses with the reasons for these choices, the combination of curricula used, the specific Massachusetts Learning Guides used, the advantages and

disadvantages of the Massachusetts CBVE materials, and the vocational areas in which other types of competency-based curriculum materials are used.

Prevalence of Each Type of Competency-Based Curriculum. The Massachusetts CBVE Learning Guides are used in 85% of school districts with some type of competency-based curriculum material. (See Exhibit 3.9.) In addition, 63% of districts use competency-based materials developed by school or district staff; and 54% use competency-based materials from other states or organizations. A small proportion (7%) of districts use competency-based materials from other sources, such as professional or trade organizations.

Nearly all districts (40/44 districts or 91%) with five or more Chapter 74 programs use the Massachusetts CBVE materials in some vocational area; this is a somewhat higher incidence of use than among districts with fewer than five Chapter 74 programs (10/15 districts or 67%). A greater proportion of regional vocational-technical schools (20/21 schools or 95%) use the Massachusetts CBVE materials than comprehensive districts (30/38 districts or 79%). The majority of regional vocational-technical schools (18/21 schools or 86%) also utilize competency-based materials developed by their own staff, which is a more prevalent occurrence than among comprehensive districts (19/38 districts or 50%).

There are no regional differences in the proportion of districts using Massachusetts CBVE Learning Guides, with approximately 75% to 100% of districts in each region using these curriculum materials. However, the use of other types of competency-based materials does vary slightly by region. For example, a greater percentage of districts in the southeast region (13/16 district or 81%) reported using competency-based materials from other states or organizations, while only 27% of districts (3/11 districts) in the central region indicated that they used this type of competency-based material. More than 80% of the districts in the Greater Springfield region (5/6 districts) and the central region (9/11 districts) use competency-based materials developed by district staff; in the other regions, this figure is between 45% and 65% of districts.

Reasons for Using Other Types of Curricula. If competency-based curricula other than the Massachusetts CBVE are used in the district, respondents were asked to explain the reasons for these choices. This was an open-ended question answered by only 31 of the 43 districts that use another type of competency-based curricula. Their responses were categorized, and are presented in Exhibit 3.10.

Exhibit 3.9

Types of Competency-Based Vocational Education (CBVE) Materials Used in School Districts

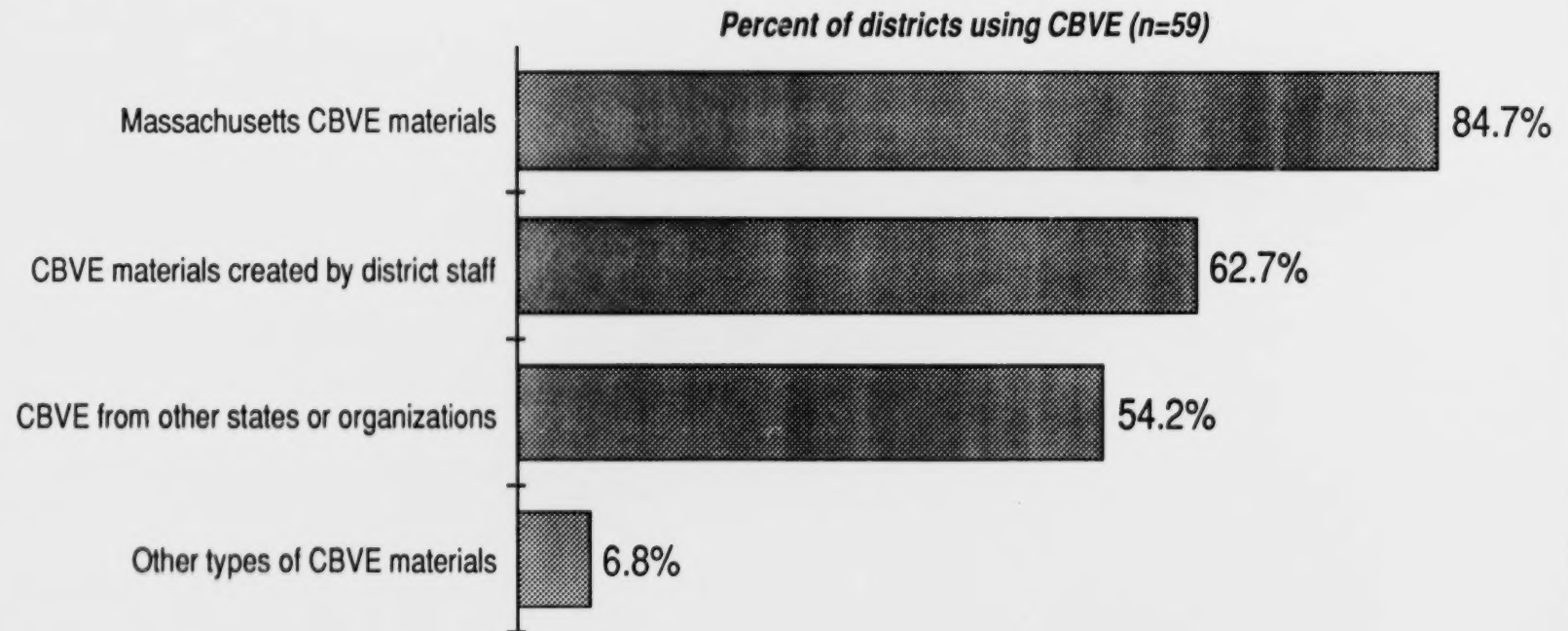
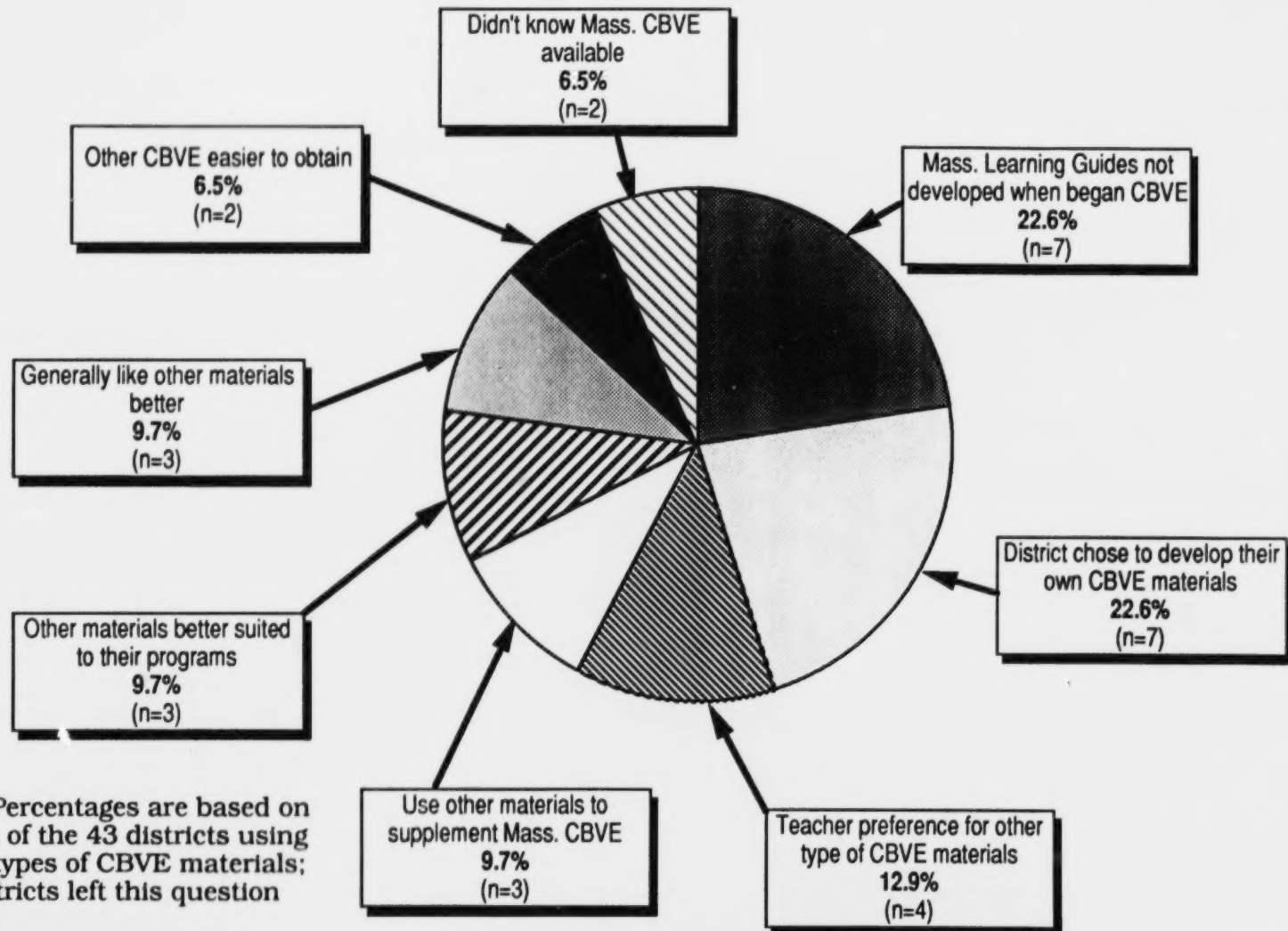


Exhibit 3.10

Reasons Why Districts Use Competency-Based Vocational Education (CBVE) Materials Other Than Massachusetts CBVE Learning Guides



The two most common reasons why districts use competency-based materials other than the Massachusetts CBVE are: (a) that the Massachusetts Learning Guides were not developed yet when the district wanted to implement competency-based curricula (23% or 7 districts); and (b) that the district chose to develop their own competency-based materials (23% or 7 districts). Preference for other types of competency-based materials also was cited as a reason for this choice; 13% of the districts (4 districts) indicated that their teachers preferred the format or content of other types of CBVE materials, 10% (3 districts) commented that the other types of materials were better suited to their programs, and 10% (3 districts) indicated that they generally liked the other materials better. Ten percent of the districts (3 districts) reported that they use other types of competency-based materials to supplement the Massachusetts CBVE curricula.

Two comprehensive districts with fewer than five Chapter 74 programs indicated that they did not use the Massachusetts CBVE because they did not know that these materials were available. Two comprehensive districts with fewer than five Chapter 74 programs commented that other types of competency-based materials were easier to obtain than the Massachusetts Learning Guides.

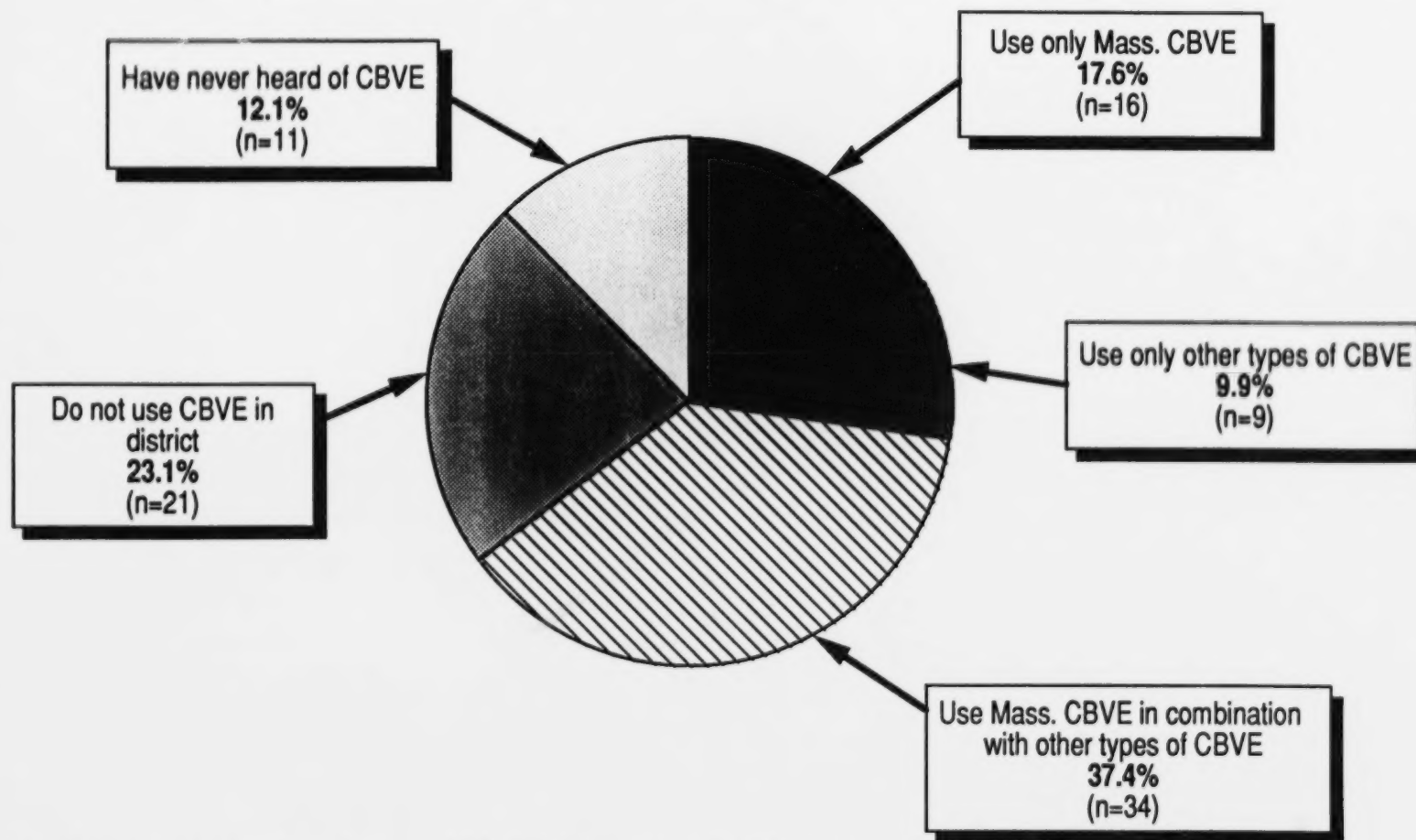
Combination of Competency-Based Curricula Used. Districts may use a combination of curriculum materials, either within one vocational area or across areas. Exhibit 3.11 displays the proportion of districts that reported using Massachusetts CBVE, other types of competency-based curricula (i.e., developed by district staff or by other states or organizations), and a combination of curriculum materials.

In 18% or 16 districts, the Massachusetts CBVE Learning Guides are the only type of competency-based curriculum materials used in the district. Approximately 37% of respondents (34 districts) indicated that they use the Massachusetts CBVE in combination with materials developed by district staff and/or other states and organizations; of this group, eight districts use Massachusetts CBVE and competency-based materials developed by district staff. Ten percent of respondents (9 districts) rely on competency-based materials other than the Massachusetts CBVE materials. Of this group, two districts use only competency-based materials developed by district staff; three districts use materials from other states and organizations; and four districts use a combination of these two types of curriculum materials.

The number of districts within each combination is too small to allow for analysis by school type, number of Chapter 74 programs or region of the state.

Exhibit 3.11

Combination of Types of Competency-Based Vocational Education (CBVE) Materials Used by Districts



Note: Percentages are based on n of 91 districts responding to survey.

Massachusetts CBVE Learning Guides Used. The survey inquired about the use of the thirteen Massachusetts CBVE Learning Guides that were available to school districts at the start of the 1988-89 school year. Information about the use of the Learning Guides disseminated in February, 1989 was not requested because they were not available to school districts at the time that the survey was conducted.

Exhibit 3.12 displays the number of Massachusetts CBVE materials used by districts. On average, districts report using 3.9 of the 13 Learning Guides. Among districts using some type of competency-based curriculum, the range in the number of Massachusetts CBVE Guides is from zero (15% or 9 districts do not use any of the Massachusetts CBVE materials) to 11 Learning Guides (2% or 1 district). Nine percent of the districts report using one Learning Guide, another 9% use Massachusetts CBVE in two areas, 27% use three CBVE Learning Guides, 19% use four to six Learning Guides, and 22% report using seven or more Learning Guides.

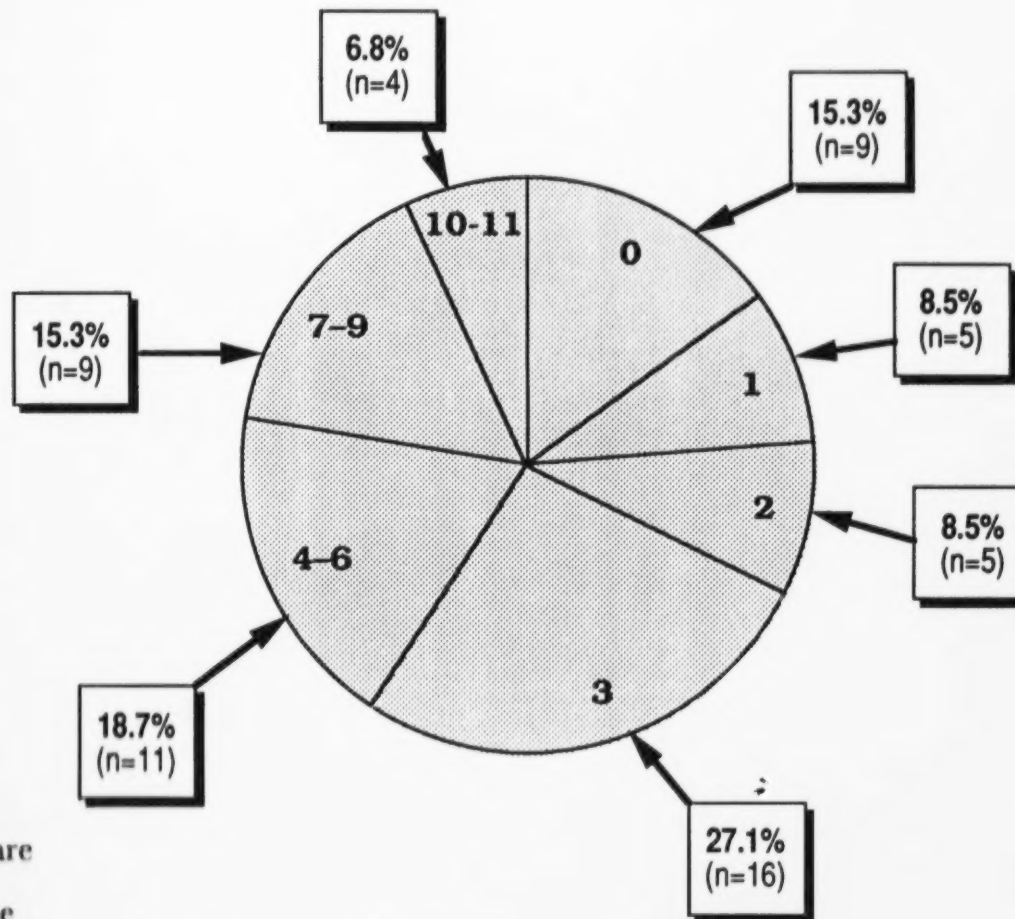
Of course, the number of Learning Guides used is related to the number of Chapter 74 programs that a district offers. Survey results indicate that districts with one to four Chapter 74 programs use an average of 1.9 Learning Guides, while districts with five or more Chapter 74 programs report using an average of 4.6 Massachusetts CBVE curricula.

Exhibit 3.13 presents the prevalence of use of each of the thirteen Massachusetts CBVE Learning Guides. Survey respondents were asked to indicate whether they used each CBVE Learning Guide, and, if not, whether they offered a course in that particular vocational area. Since many districts do not offer vocational courses in all thirteen areas, the most relevant statistic is the proportion of districts using a CBVE curriculum out of districts that offer the course. That statistic is presented in the last column on Exhibit 3.13 and labelled "Prevalence of Use Among Districts Offering Course". It is important to keep in mind that this proportion refers only to the 59 districts using some type of competency-based curriculum, and does not reflect the total number of districts in the state that offer each type of vocational course.

Four Learning Guides are used by more than 70% of districts offering the course: auto mechanics (79%), health assistant (71%), hotel and lodging (89%), and ornamental horticulture (78%). However, it is important to point out that since auto mechanics' courses are offered by a large number of districts, while courses in ornamental horticulture and hotel and lodging are offered by a small number of districts,

Exhibit 3.12

Number of Massachusetts Competency-Based Vocational Education (CBVE) Learning Guides Used by Districts



Note: Percentages are based on n of 59 districts using some type of CBVE curriculum materials.

Average number of Mass. CBVE used: 3.9

Median number of Mass. CBVE used: 3.0

Total number of Mass. CBVE materials available to districts at start of 1988-89 school year: 13

Exhibit 3.13

Vocational Area of Massachusetts Competency-Based Vocational Education (CBVE) Learning Guides Used by Districts

Vocational Area of Mass. CBVE ^a	Percent of Districts ^b			Prevalence of Use Among Districts Offering Course ^c	
	Use Mass. CBVE	Do Not Use Mass. CBVE	Do Not Offer Course	%	(Total n)
Auto mechanics	62.7%	16.9%	20.3%	78.7%	(47)
Child development assistant	16.9	13.6	69.5	55.6	(18)
Computer technology	20.3	44.1	35.6	31.6	(38)
Drafting	37.3	30.5	32.2	55.0	(40)
Electrical technology	33.9	32.2	33.9	51.3	(39)
Electronics	40.7	32.2	27.1	55.8	(43)
Food management, production and services	45.8	27.1	27.1	62.8	(43)
General merchandising	25.9	31.0	43.1	45.5	(33)
Health assistant	28.8	11.9	59.3	70.8	(24)
Hotel and lodging	13.6	1.7	84.7	88.9	(9)
Machine technology	33.9	33.9	32.2	50.0	(40)
Medical assistant	20.3	11.9	67.8	63.2	(19)
Ornamental horticulture	11.9	5.4	84.7	77.8	(9)

^aList includes Mass. CBVE Learning Guide completed and disseminated by the start of the 1988-89 school year.

^bPercentages are based on n of 59 districts using some type of CBVE materials in vocational classes.

^cBased on districts responding to this question; percentages do not reflect all districts offering course statewide.

the absolute number of districts using CBVE Learning Guides in each of these areas is quite different: 37 out of 47 districts use CBVE in auto mechanics, compared with 8 out of 9 districts using hotel and lodging*, and 7 out of 9 districts using ornamental horticulture.

The two CBVE Learning Guides used by fewer than half of the districts are: computer technology, utilized by only 32% of districts offering the course, and general merchandising, used by 46% of districts offering the course.

Since these results are considered in terms of whether the district offers the particular vocational course, these data were not analyzed by the type of district or the number of Chapter 74 programs offered. Due to the small number of districts, these results were not disaggregated by region.

Reasons for Using Massachusetts CBVE in Particular Areas. District administrators were asked to indicate the reasons why they decided to implement Massachusetts CBVE curricula in particular vocational areas. Their responses are summarized in Exhibit 3.14.

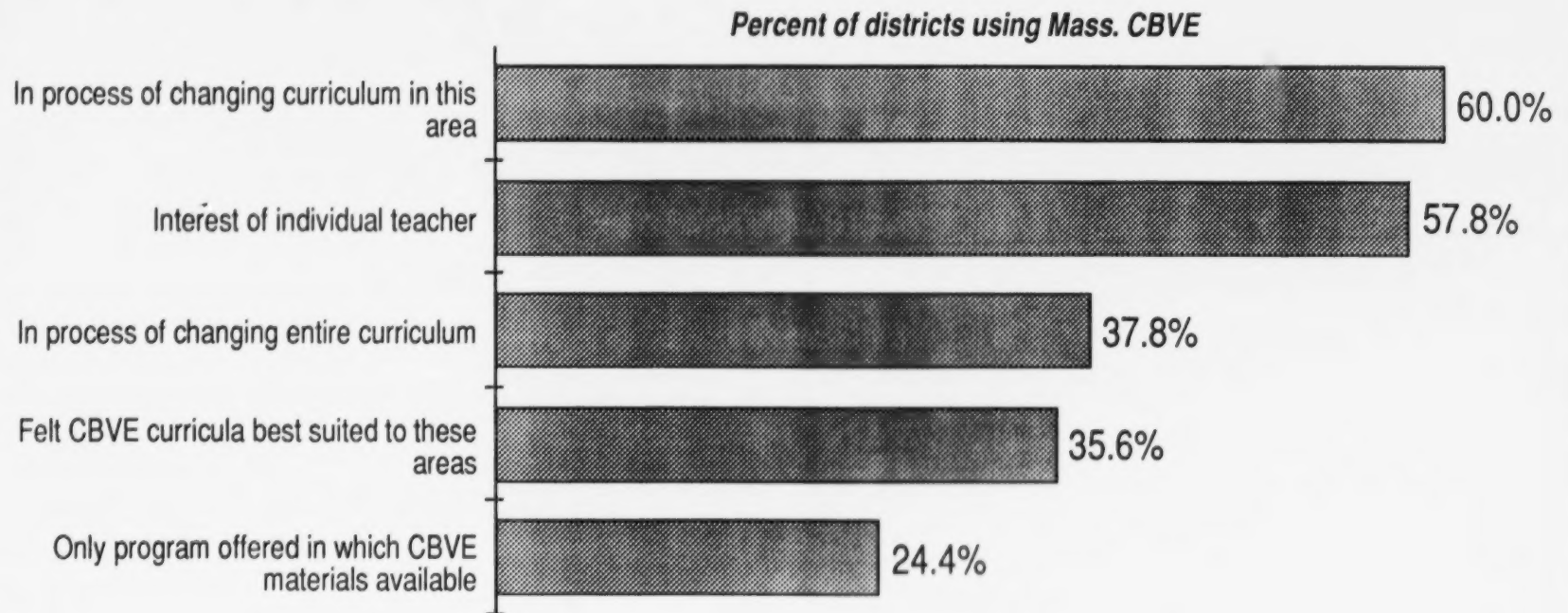
The two most common reasons for choosing a particular CBVE Learning Guide are (a) that the district is in the process of changing the curriculum in that area (60%); or (b) the interest of an individual teacher (58%). Thirty-eight percent of the respondents indicated that they selected Massachusetts CBVE materials because they were in the process of changing their entire vocational curriculum, while 36% commented that they felt that the CBVE curriculum materials were best suited to a particular program area. Only 24% of respondents indicated that the choice was based on the fact that these were the only programs they offered in which CBVE materials were available.

Advantages or Strengths of Massachusetts CBVE Curricula. District administrators were asked about the strengths or advantages of the Massachusetts CBVE curricula. This question was not asked of the ten districts who responded to the survey over the telephone; in addition, seven districts that use some type of CBVE materials left this open-ended question blank. Thus, information is available from only 42 districts. Their responses were categorized into eight areas and are summarized in Exhibit 3.15.

*It is interesting to note that only two of these districts are listed in the Directory of Massachusetts Vocational Schools and Programs Offered as offering courses in hotel and lodging; however, since the other six districts offer courses in either food management, production and service or in general merchandising, it seems that districts might use sections of a particular CBVE guide in more areas than simply the program for which it was developed.

Exhibit 3.14

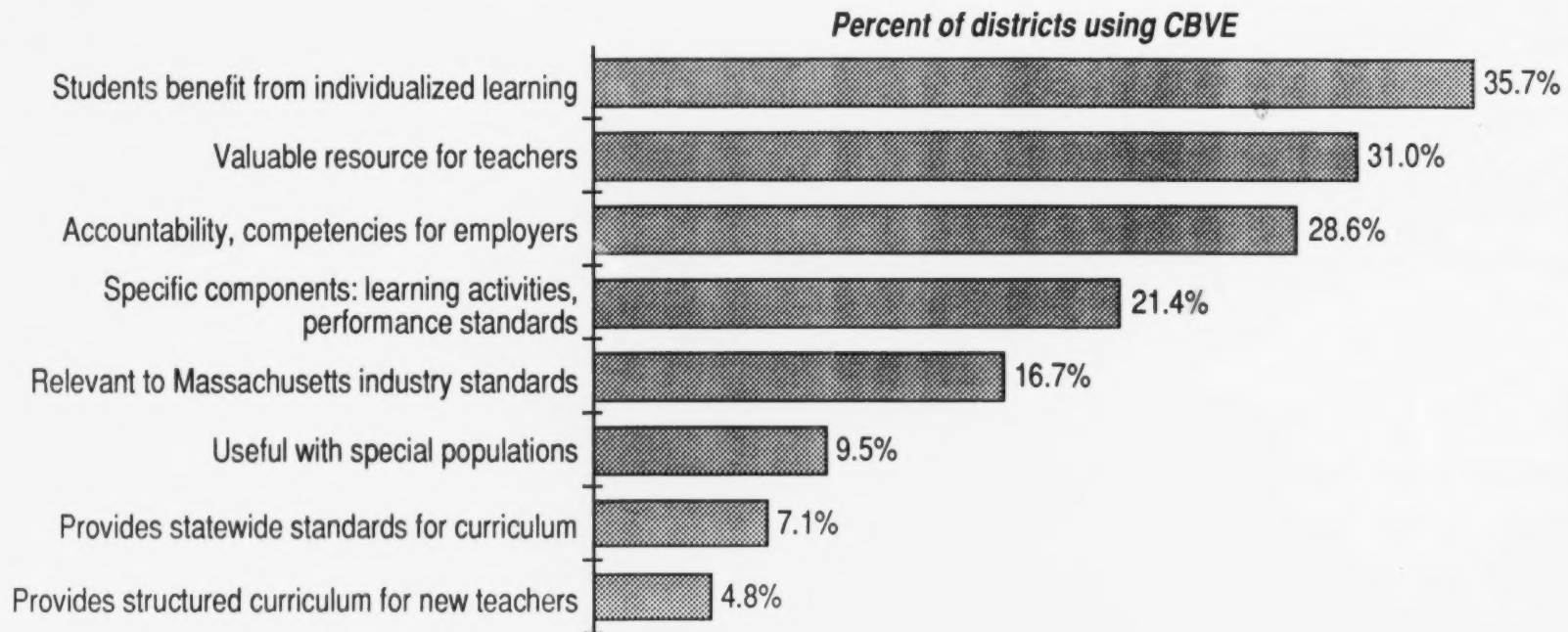
Reasons Why Districts Chose to Use Massachusetts CBVE Curricula in Particular Vocational Areas



Note: Percentages are based on 45 of the 50 districts using Massachusetts CBVE materials; 5 districts responded to the survey over the telephone and were not asked this question.

Exhibit 3.15

Advantages or Strengths of Massachusetts CBVE Learning Guides



Note: Percentages are based on 42 of the 59 districts using some type of CBVE materials; 10 districts responded to the survey over the telephone and were not asked this question; 7 districts left this question blank.

The value of individualized learning for students was cited by 36% of respondents as an advantage of the Massachusetts CBVE Learning Guides. Thirty-one percent of the respondents commented that the Massachusetts CBVE materials are valuable resources for teachers, noting that they offer curriculum activities that can be adapted by teachers and which save teachers' time in curriculum development. Nearly 30% of respondents indicated that accountability was a key advantage of the Massachusetts CBVE curricula, that they provided measurable results of student progress, and offered specific competencies for prospective employers. Other advantages of the Massachusetts CBVE Learning Guides included that they are relevant to state industry standards (17%), useful with special student populations (10%), they provide statewide standards for vocational education (7%), and they offer a structured curriculum for new teachers (5%).

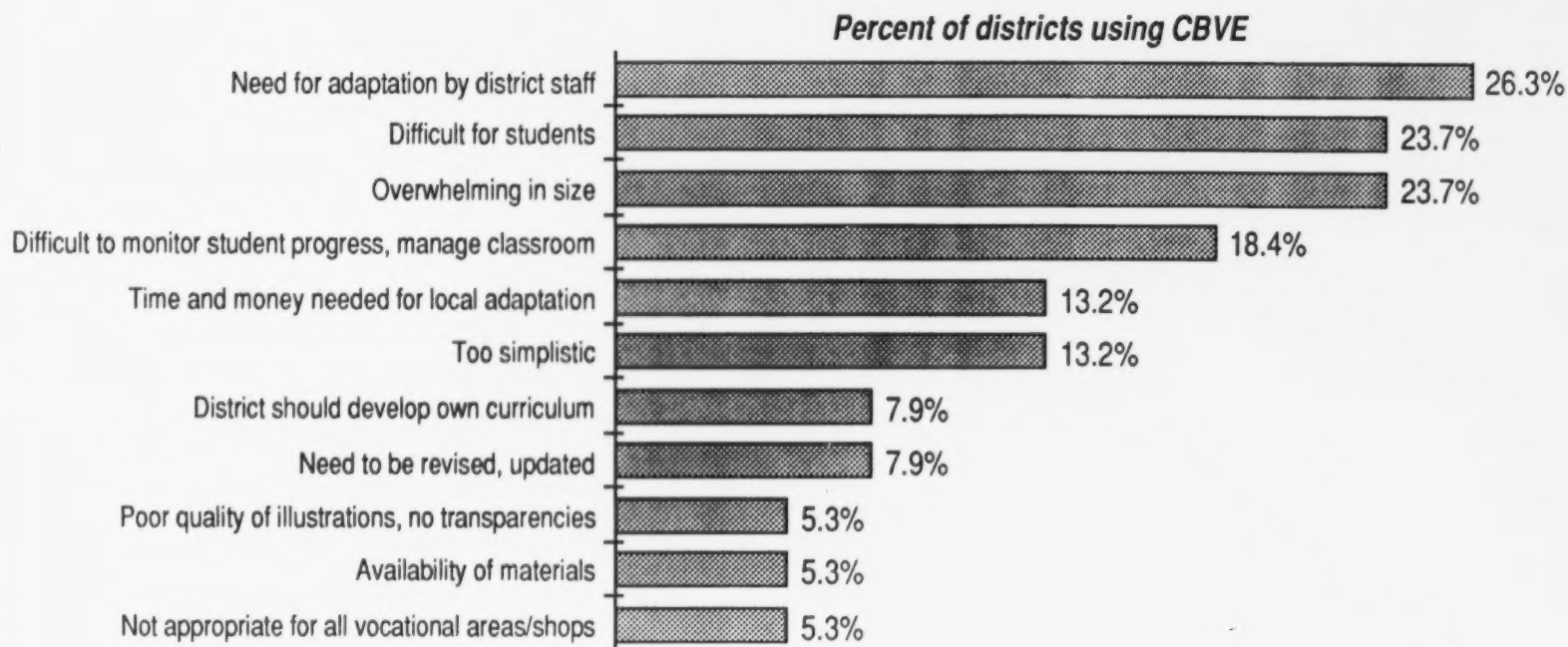
A larger proportion of administrators at regional vocational-technical schools (32%) than administrators in comprehensive districts (4%) indicated that the link between the CBVE Learning Guides and industry standards is an advantage of the Massachusetts CBVE curricula. There were no other meaningful differences in the advantages listed by type of district, number of Chapter 74 programs, or regions of the state.

Disadvantages or Limitations of Massachusetts CBVE Curricula. District administrators also were asked about the disadvantages or limitations of the Massachusetts CBVE curricula. This question was not asked of the ten districts who responded to the survey over the telephone; in addition, eleven districts that use some type of CBVE materials left this open-ended question blank. Thus, information is available from only 38 districts. Their responses were categorized into eleven areas and are summarized in Exhibit 3.16.

The three most common limitations of the Massachusetts CBVE materials are: the need for adaptation by district staff (26%), the difficulty of the materials for students (24%), and that the materials are overwhelming in size (24%). Eighteen percent of respondents stated that the CBVE materials pose classroom management problems. In addition to the administrators citing in general terms the need for local adaptation of the materials, 13% of respondents also commented that the time and money required to adapt the materials were problems for the district. While some administrators felt that the curricula were too difficult for students, others (13%) stated that the materials were too simplistic and needed a greater variety of activities. Other disadvantages or limitations of the Massachusetts CBVE Learning Guides include that: they need to be revised and updated (8%); the quality of illustrations is poor (5%); materials are difficult

Exhibit 3.16

Disadvantages or Limitations of Massachusetts CBVE Learning Guides



Note: Percentages are based on 38 of the 59 districts using some type of CBVE materials; 10 districts responded to the survey over the telephone and were not asked this question; 11 districts left this question blank.

to obtain (5%); they are not appropriate for all vocational areas or shops (5%); and districts should be developing their own curriculum materials (8%).

There are no meaningful differences in the disadvantages cited by districts according to the type of district, number of Chapter 74 programs or region of the state.

Other Types of Competency-Based Curricula Used. As Exhibit 3.11 illustrated, 47% of survey respondents (43 districts) use other types of competency-based curriculum materials either alone or in combination with the Massachusetts CBVE Learning Guides. These other materials include those developed by the district as well as materials available from other states and organizations.

Although the survey did not explicitly ask for the source of these curricula, many administrators included this information in their response to why these materials were selected. The two most prevalent competency-based curricula from other sources cited by respondents include those from Oklahoma and the Mid-America Vocational Curriculum Consortium (MAVCC). Other curricula listed include those from V-TECS, the Ohio State Materials Lab, the National Tool and Machine Association (NTMA), and National DECA Materials Lab.

If the district uses competency-based materials other than Massachusetts CBVE Learning Guides, district administrators were asked to indicate the vocational areas of these curricula. Only 31 of the 43 districts provided this information. These results are categorized in Exhibit 3.17 by whether Massachusetts CBVE Learning Guides have been disseminated in this area, are in development or are not available. The vocational areas of the other types of competency-based curricula used are actually quite varied, with only carpentry cited by more than half of the respondents. In addition, there does not seem to be a particular vocational area in which a large proportion of districts have decided to use another type of competency-based curriculum rather than the Massachusetts materials.

Use of Massachusetts Math/Science Competencies

One survey question focused on the Math/Science Competencies developed as a part of the Massachusetts CBVE project. District administrators were asked whether the available Math/Science Competencies were being used in their district. Currently, the Math/Science Competencies are lists or matrices of math and science skills required in different vocational programs. Work is underway to develop math problems and science activities to teach these skills.

Exhibit 3.17

Vocational Areas in Which Districts Use Competency-Based Curriculum Materials Other Than Massachusetts CBVE Learning Guides

Vocational Area	Percent of Districts (n)	
Massachusetts CBVE Disseminated:		
Auto mechanic	19.4%	(6)
Child development assistant	3.2	(1)
Computer technology	6.5	(2)
Drafting	25.8	(8)
Electrical technology	25.8	(8)
Electronics	25.8	(8)
Food management, production and services	12.9	(4)
General merchandising	6.5	(2)
Health assistant	6.5	(2)
Hotel and lodging	0.0	(0)
Machine technology	25.8	(8)
Medical assistant	0.0	(0)
Ornamental horticulture	3.2	(1)
Massachusetts CBVE in Development:		
Auto body repair	19.4	(6)
Carpentry	54.8	(17)
Graphic arts/commercial arts	25.8	(8)
Heating, ventilation and air conditioning	12.9	(4)
Metal fabrication	12.9	(4)
Painting and decorating	9.7	(3)
Plumbing and pipefitting	16.1	(5)
No Massachusetts CBVE Developed:		
Agriculture	6.5	(2)
Construction	6.5	(2)
Cosmetology	25.8	(8)
Culinary arts	19.4	(6)
Data processing	12.9	(4)
Distributive education	16.1	(5)
Small engine/appliance repair	12.9	(4)

Note: Percentages are based on n of 31 districts identifying other types of CBVE materials used in the district; 12 districts that use other types of CBVE materials left this question blank.

As Exhibit 3.18 shows, only 14% of districts (13 districts) indicated that they used the Math/Science Competencies in any vocational area. Exhibit 3.19 lists the nine vocational areas in which Math/Science Competencies were available as of the start of the 1988-89 school year and presents the prevalence of use in each area.

Similar to the use of the CBVE Learning Guides, the largest proportion of districts use the Math/Science Competencies in ornamental horticulture (27%), auto mechanics (21%), hotel and lodging (18%) and electrical technology (18%). However, the actual number of districts using any of these materials is quite small: eight districts use Math/Science Competencies for auto mechanics, six districts in electrical technology, three districts for ornamental horticulture, and two districts in hotel and lodging. No districts reported using the Math/Science Competencies for medical assistants.

Where the Math/Science competencies are utilized, they are used either by vocational teachers or by both vocational and academic teachers. Only one or two districts indicated that the Math/Science Competencies are used by academic teachers and not by vocational teachers.

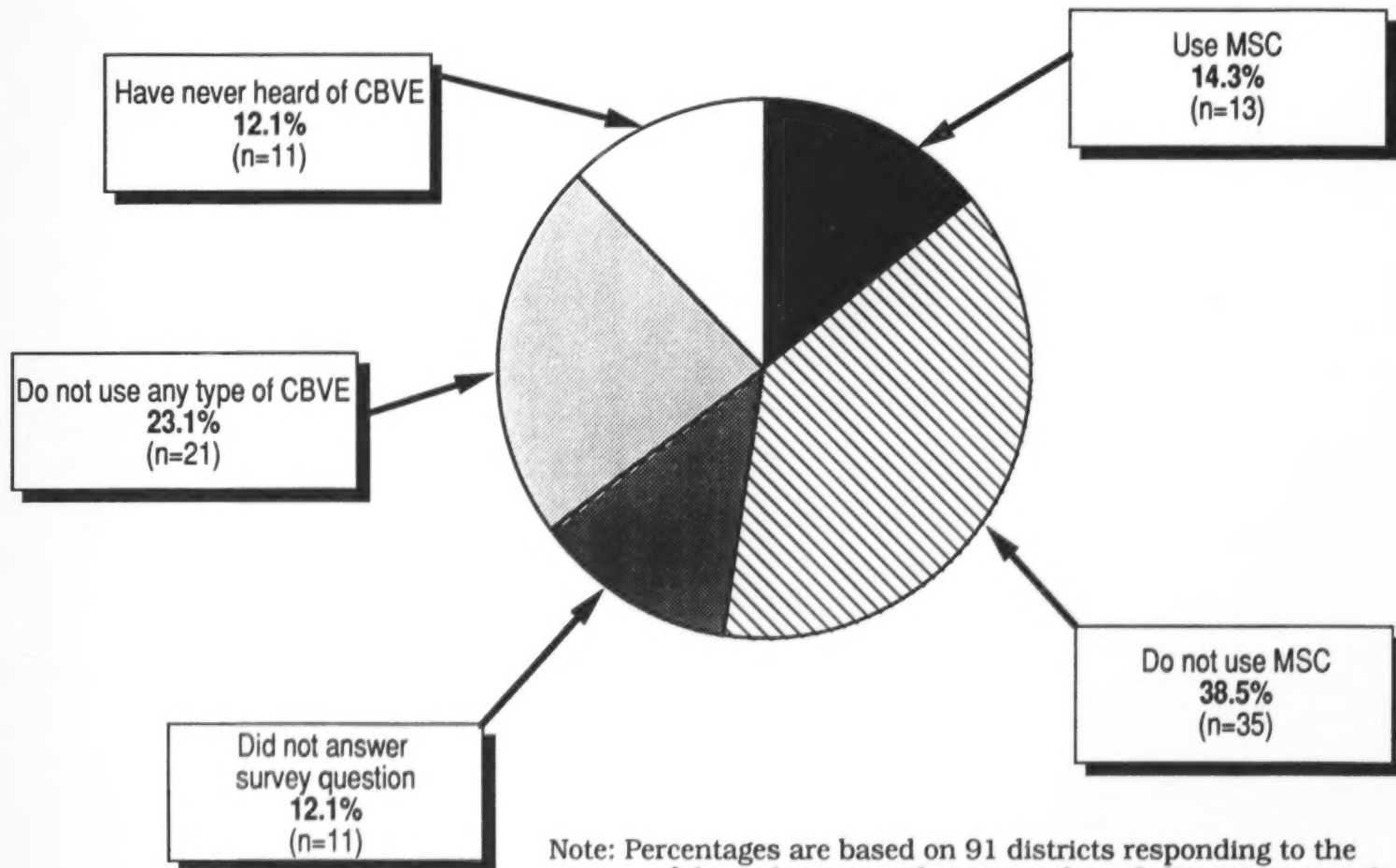
Summary of Survey Results

This section summarizes the key survey findings about administrators' knowledge of competency-based vocational education and their perceptions of the use of CBVE materials in Massachusetts school districts. The implications of these findings and recommendations are discussed in the final chapter of this report, after information from the teacher interviews has been presented.

- Nearly all administrators (88%) in districts with Chapter 74 programs have heard about competency-based vocational education. All of the administrators who have not heard of CBVE work in districts with fewer than five Chapter 74 programs.
- More than 70% of administrators are familiar with CBVE concepts and have reviewed competency-based curriculum materials.
- Administrators in districts with five or more Chapter 74 programs are more likely to have reviewed Massachusetts CBVE curricula than administrators in districts with fewer than five Chapter 74 programs (98% versus 78%).
- The two most common ways that administrators have heard about CBVE are through publications or workshops sponsored by the Division of Occupational Education, the Massachusetts Vocational Curriculum Resource Center (MVCRC) or the State Leadership Team.

Exhibit 3.18

Percentage of Districts Using Massachusetts Math/Science Competencies (MSC)



Note: Percentages are based on 91 districts responding to the survey; of those districts with missing data, 6 districts responded to the survey over the telephone and were not asked this question, and 5 districts left this question blank.

Exhibit 3.19

Vocational Area of Massachusetts Math/Science Competencies (MSC)
Used by Districts

Vocational Area of Mass. MSC ^a	Percent of Districts ^b					Prevalence of Use Among Districts Offering Course ^c % (Total n)	
	Use Mass. MSC in Voc.	Use Mass. MSC in Acad.	Use Mass. MSC in Both	Do Not Use Mass. MSC	Do Not Offer Course		
Auto mechanics	8.3%	2.1%	6.3%	64.6%	18.8%	20.5%	(39)
Computer technology	2.1	0.0	2.1	64.6	31.3	6.1	(33)
Electrical technology	2.1	4.2	6.3	56.3	31.3	18.2	(33)
Food management, produc- tion and services	4.3	0.0	4.3	61.7	29.8	12.1	(33)
General merchandising	2.1	0.0	6.3	45.8	45.8	15.4	(26)
Health assistant	2.1	0.0	4.2	39.6	54.2	13.6	(22)
Hotel and lodging	0.0	0.0	4.2	18.8	77.1	18.2	(11)
Medical assistant	0.0	0.0	0.0	31.3	68.8	0.0	(15)
Ornamental horticulture	4.2	2.1	0.0	16.7	77.1	27.3	(11)

^aList includes Mass. Math/Science Competencies developed and disseminated by the start of the 1988-89 school year.

^bPercentages are based on 48 of the 59 districts using competency-based materials; 6 districts responded to the survey over the telephone and were not asked this question; 5 districts left this question blank.

^cBased on districts answering this question; percentages do not reflect all districts offering course statewide.

- The majority of administrators who have reviewed CBVE materials have done so at workshops sponsored by the state or at the MVCRC. However, a greater percentage (72%) of administrators in districts with five or more Chapter 74 programs have seen Massachusetts CBVE curriculum materials at workshops than administrators in districts with fewer than five Chapter 74 programs (40%).
- Sixty-five percent of districts with Chapter 74 programs currently use some type of competency-based curriculum in their vocational classes. "Use" was broadly defined to include accessing materials as references or resources.
- The use of competency-based curricula is strongly related to the number of Chapter 74 programs in the district -- only 38% of districts with fewer than five Chapter 74 programs use CBVE materials, as compared with 86% of districts with five or more Chapter 74 programs.
- Among districts using some type of competency-based curriculum, 85% use the Massachusetts CBVE Learning Guides, 63% use materials developed by district staff, and 54% use materials from other states or organizations (e.g., Oklahoma, Mid-America Vocational Curriculum Consortium).
- A higher percentage of districts with five or more Chapter 74 programs use the Massachusetts Learning Guides than districts with fewer Chapter 74 programs (91% versus 67%); similarly, a higher proportion of regional vocational-technical schools use the Massachusetts CBVE materials than comprehensive districts (95% versus 79%).
- The two most common reasons why districts use competency-based materials other than the Massachusetts Learning Guides are: (a) that the state CBVE materials were not developed when the district wanted to implement competency-based curricula, and (b) that district staff chose to develop their own CBVE materials.
- Districts generally use a combination of types of competency-based materials. More than one-third of districts that use some type of competency-based curriculum materials indicated that they use the Massachusetts CBVE as well as materials developed by district staff and/or other states and organizations. Only 18% use the Massachusetts materials alone, while 10% use other types of competency-based materials and not the Massachusetts materials.
- Individual districts use as many as eleven of the thirteen available Massachusetts CBVE Learning Guides. Districts with fewer than five Chapter 74 programs report using an average of 1.9 Learning Guides, while districts with five or more Chapter 74 programs report using an average of 4.6 Massachusetts CBVE curricula.

- The four Massachusetts CBVE Learning Guides used by more than 70% of the districts offering the course are: auto mechanics (79%), health assistant (71%), hotel and lodging (89%), and ornamental horticulture (78%).
- The Massachusetts CBVE Learning Guides for computer technology and general merchandising are used by less than half of the districts offering these courses.
- The three most common strengths or advantages of the Massachusetts CBVE materials cited by administrators are: the benefits of individualized learning for students; the value of the materials as curriculum resources for teachers; and the importance of accountability and measurable student results.
- The three most common disadvantages or weaknesses of the Massachusetts CBVE materials cited by administrators are: the need for adaptation by district staff; the difficulty of the material for students; and the overwhelming size of the materials.
- Math/Science Competencies are used by only 14% of the districts that use some type of competency-based vocational curriculum. The most prevalent areas used are: auto mechanics, electrical technology, hotel and lodging, and ornamental horticulture.

CHAPTER IV

DEVELOPMENT AND DISSEMINATION OF CBVE MATERIALS

This chapter describes the process of developing the Massachusetts CBVE Learning Guides and disseminating the materials to school districts across the state. The first section discusses the training that teachers received, the steps involved in writing the curriculum materials and the difficulties encountered in this endeavor. The second section focuses on the dissemination of the Massachusetts CBVE curriculum materials, including the role of the State Leadership Team and district staff. The last section of the chapter summarizes the key findings that have implications for future work in developing CBVE curriculum materials.

Information for this chapter comes primarily from interviews with teachers who developed Massachusetts CBVE Learning Guides. We spoke with teachers who had written the Learning Guides in five vocational areas: accounting and computing; auto mechanics; commercial art; graphic arts; and plumbing and pipefitting.

Information pertaining to the development and dissemination of the Massachusetts CBVE Learning Guides also was obtained from in-person interviews with individuals both directly and indirectly involved in the development and dissemination process, including:

- administrators in school districts using the CBVE curriculum materials;
- members of the State Leadership Team;
- Occupational Education staff in the regional education centers;
- Occupational Education staff in the central office; and
- the Director of the Massachusetts Vocational Curriculum Resource Center (MVCRC).

In addition, we reviewed the Massachusetts Manual for Competency-Based Vocational Education Curriculum Development used to train developers of the Massachusetts CBVE Learning Guides. The manual itself is organized as a competency-based curriculum, with the tasks corresponding to the components necessary to write a competency-based curriculum (e.g., preparing a task listing, constructing performance tests) and the format (e.g., page layout, graphics, labeling of sections) identical to the one used in the Massachusetts CBVE Learning Guides.

The Process of Developing CBVE Learning Guides

The Massachusetts CBVE Learning Guides were developed by vocational teachers currently working in schools in the state. The writing of the Learning Guides was based on a "paired school" concept, where teachers from schools in different parts of the state would work together to develop the curriculum materials. In this way, the Learning Guides would reflect the range of skills taught in vocational programs in different regions of the state.

Recruiting Teachers to Develop CBVE Materials

The Division of Occupational Education announced the availability of funds for teachers to develop competency-based curriculum materials and asked for proposals from school districts. From these proposals, two districts were selected to write a CBVE Learning Guide in a specific vocational area. In larger vocational areas, more than two districts were involved in writing the Learning Guides.

The teachers interviewed gave different explanations about how they became involved in developing the CBVE Learning Guides. Several teachers indicated that they had an interest in curriculum development and saw this as a good opportunity to get involved; a few teachers stated explicitly that they wanted to develop a better curriculum in their vocational area. In one district, teachers were approached by the administration and asked if they were interested in developing curricula for the state; in other districts, teachers indicated that they saw a notice posted or received a letter from the state.

Training Teachers to Develop CBVE Learning Guides

During the Massachusetts Annual Professional Development Conference, workshops were held to train the teachers writing the CBVE Learning Guides. Since the summer of 1984, when the State Leadership Team contract was awarded to Greater Lowell Regional Vocational-Technical School District, these training workshops have included six sessions led by members of the State Leadership Team over a four-day period. Part of the purpose of these sessions was to discuss the task listings for a particular vocational area and to divide the tasks among the schools writing the CBVE Learning Guides.

All of the teachers interviewed who had been involved in developing Massachusetts CBVE Learning Guides indicated that they received some type of training prior to writing the curriculum materials. Most teachers indicated that they attended training sessions at the Annual Professional Development Conference in Fitchburg or Westfield. Other teachers said that they received information about the goals of competency-based vocational curricula and the Massachusetts model in courses held outside of the Professional Development Conference. For example, one teacher said that he attended a course at the University of Massachusetts at Boston, and two teachers indicated that they attended a course given at Greater Lowell Regional Vocational-Technical School for five or six weeks after school hours.

A number of teachers commented that the training was not that helpful. One teacher noted that the training manual was confusing because it is written in the format of a CBVE Learning Guide. Several teachers felt that they had only a cursory understanding of CBVE as they began the task of writing the Learning Guides. As one teacher put it, "[The training] worked out okay, but I really didn't understand it until I had the first [Learning Guide] under my belt." Another teacher also said that he learned more about CBVE as he began writing the curriculum, and, since the forms were so structured, "it was just a case of following the forms."

Writing the CBVE Learning Guides

Steps in the Process. There were multiple stages involved in writing the Learning Guides. One teacher showed us an elaborate chart with 14 steps by which she tracked the progress of the development, including her responsibility of writing a Guide, giving it to a secretary to type, edits by an English teacher in the school, and revisions by members of the State Leadership Team. While this process varied somewhat from teacher to teacher, a general pattern of development emerged. In all cases, the components of each task in the Learning Guide (e.g., enabling objectives, learning activities, performance assessments) were written by vocational teachers. Districts either paid school secretaries or contracted with an outside individual to type the materials. These Guides were then edited for grammatical and spelling errors.

In almost all cases, teachers from different schools working on the same Learning Guide did not meet with one another after they had divided up the task listings. Although members of the State Leadership Team reviewed sections written by different schools, it does not appear that teachers working on different sections of the same Learning Guide had the opportunity to collaborate and share information with their

colleagues in other schools. In some cases, teachers at the same school working on a Learning Guide would discuss their work, but this also did not appear to happen in all cases. Generally, teachers described the process of writing the Learning Guides as one they did alone.

Validating the Task Lists. The training manual states that a "tentative task listing should be reviewed by qualified individuals to determine its accuracy and relevancy" (page 67). Members of the State Leadership Team indicated that, after the task lists were divided among the paired schools, teachers involved in developing CBVE Learning Guides were supposed to have the task listings validated by people working in the particular vocational field. However, it is unclear whether the task listings were validated before teachers began writing the Learning Guides. Only one automotive teacher specifically indicated that, after the tasks were divided up during the summer Professional Development Conference, he took his list of tasks to garages to be validated. One teacher indicated that the task listings were based on tasks from V-TECS, a national consortium of states writing task listings. When asked about validation of the task listing, another teacher responded that since there is a curriculum Advisory Committee at the school, "presumably, we're teaching what industry wants us to." It may be that teachers felt that the task listings are valid, since they are based on curriculum presently taught at their school, which often are validated by their Program Advisory Committee.

Editing the Learning Guides. There also seem to be differences among developers in the process of editing and proofreading the Guides. Some teachers said that once their tasks were typed, they were given to an English teacher in the school for editing and proofreading. These revised Guides were then either sent to the State Leadership Team for comment or reviewed by a member of the State Leadership Team together with developers at their school. However, in other cases, teachers stated that once tasks were completed, they were sent directly to the State Leadership Team for editing, and that there was no editing done by English teachers in their school.

Members of the State Leadership Team described their role as editing for grammatical and technical errors. They have assembled a Technical Assistance Team comprised of English teachers and vocational teachers from Greater Lowell Regional Vocational-Technical School. This team works as editors and technical writers to provide comments on tasks written by the teachers developing materials. Often, their comments about initial tasks in the Learning Guide focus on the extent to which the Guides follow the Massachusetts CBVE format. The Learning Guides are then returned to the teacher developing the materials for revisions.

Several teachers commented that members of the State Leadership Team were very helpful during the process of developing the CBVE Learning Guides. In particular, teachers indicated that the State Leadership Team was available for clarifications and explanations about the details of writing the Learning Guides.

While teachers generally praised the State Leadership Team, several commented that it was difficult having teachers outside of their vocational field edit the materials. For example, English teachers, whether at the developing school or in Lowell, often are not familiar with the technical terms of a particular vocational area. Thus it is difficult for the editors to catch errors that affect substantive meaning or to improve written text without having knowledge of the technical area.

Timeframe of Development. All of the teachers interviewed began writing the CBVE Learning Guides during the summer. Many teachers described working full-time, writing five hours a day for two months. Other teachers worked part-time during the summer. Since few teachers finished writing during the summer, most continued work on the Learning Guides during the school year, working nights, weekends and vacations. One teacher estimated that it could take an average of ten to twelve hours to write the Learning Guide for one task, and as much as twenty-five hours per task. Some teachers did not recollect exactly how many hours it took to write the Guides, except that they worked on them for more than a year.

It seems that the amount of time it took an individual teacher to finish his or her tasks depended somewhat on the number of tasks assigned. For example, in commercial art, three teachers (one at one school, two at another) were each to write Learning Guides for 60 tasks, while in graphic arts, four schools divided up the tasks, with as many as three instructors working at each school.

Nevertheless, it was clearly an extensive effort by all teachers involved. Most teachers commented on the amount of time it took to write the curricula. One teacher said that originally they had planned to finish writing over the summer, but that timeframe was unrealistic and impinged on teacher creativity, so that "you start cutting corners....the first [Learning Guides] are more interesting than the last ones."

Finding the time to write during the school year was a particular problem for teachers. One teacher suggested that developers should be able to use release time to work on the Learning Guides, since this would also allow more concentrated effort than scattered nights and weekends.

Some teachers felt that writing the Learning Guides was a good experience, although they were not sure they would do it again. For example, one teacher calculated that, given the amount of time required to write the Learning Guide, the hourly rate was about "\$1.50 an hour." Another teacher said, "There was not enough money for the work I did, but it was a good experience... a good review of my knowledge of the field."

An administrator at a school where teachers developed CBVE Learning Guides also expressed concern about the work involved in developing these curricula. Since teachers only have a limited amount of time and energy to devote to curriculum development, the administrator indicated that he would rather have teachers working on curriculum development in their school rather than for the state. He was reluctant to have teachers in his school involved in writing another Massachusetts CBVE curriculum.

The amount of time involved in writing the CBVE Learning Guides can also be inferred from the lag time between the awarding of the grant to develop the materials and the dissemination of the material. These dates were presented in Exhibit 1.1 in Chapter I of this report. Some Learning Guides were available in the school year following the development year (e.g., computer technology, ornamental horticulture), while a few took as many as four years (e.g., carpentry, electronics technology). However, on average, it took two to three years for the Massachusetts CBVE Learning Guides to be developed, revised, printed and disseminated.

In some cases, there were extenuating circumstances that increased the time to completion. For example, copyright issues had to be resolved before the electronics CBVE manual could be released. In another situation, one of the districts receiving a development grant ran out of money before all of the tasks were typed. However, based on our interviews, it seems that the length of time generally was a function of the amount of work required by teachers that had to be undertaken over the summer and after school hours during the school year.

Disseminating CBVE Learning Guides

This section focuses on how the Massachusetts CBVE Learning Guides are distributed to school districts and to teachers. Getting information to teachers and administrators about CBVE and issues in implementing these curricula are discussed in Chapter VI of this report.

State Leadership Team

The State Leadership Team at Greater Lowell Regional Vocational-Technical School has been responsible for distributing all of the available CBVE Learning Guides to school districts. This mainly has been accomplished through dissemination workshops held at Greater Lowell Regional Vocational-Technical School.

Dissemination Workshops. Districts with five or more Chapter 74 programs are invited to the dissemination workshops in a letter from the Division of Occupational Education. In addition, notification is sent to Occupational Education staff in the regional centers and listed in newsletters from the Department of Education.

To date, four dissemination workshops have been held: March, 1985; January, 1986; January, 1987; and February, 1989. At each workshop, the most current group of completed Massachusetts CBVE Learning Guides and Math/Science Competencies are distributed. Each district receives one set of CBVE materials free of cost.

Between 90 and 120 people have attended each workshop. Participants are usually the superintendent or superintendent-director or another administrator, such as an assistant superintendent or curriculum coordinator.

Districts that are not able to send representatives to the workshop receive their CBVE materials at a later date. In some cases, staff from the regional center will bring materials back to distribute to districts in their region. On other occasions, materials are held until someone from the school is able to get to Lowell. This can defer the dissemination by a month or more. However, the size and weight of the materials make it costly to send multiple Learning Guides through the mail.

Requests for Materials. Districts that do not attend dissemination workshops can request individual Learning Guides from the State Leadership Team. These requests generally come from districts with fewer than five Chapter 74 programs. In these cases, one set of the materials are distributed free of charge, either through the mail or by visiting Greater Lowell Regional Vocational-Technical School.

School districts and educational institutions outside of Massachusetts also have requested copies of the Massachusetts CBVE Learning Guides and Math/Science Competencies. In these cases, the State Leadership Team charges a fee for the materials (\$80 for each CBVE Learning Guide; \$7 for each Math/Science Competency list).

District Administration

After the dissemination workshops, it is the responsibility of the district administration to distribute the CBVE materials to the appropriate teachers or department heads. In some districts, this may not happen. Staff in the regional offices described receiving calls from teachers who are interested in the CBVE Learning Guides and wanted to know how to get the materials, when, in fact, the Learning Guides were already in an administrator's office in their school. A newly hired curriculum coordinator in one school explained that before that position was created, the Massachusetts CBVE curriculum materials were "literally under lock and key in the vocational coordinator's office."

In some districts, it seems that administrators simply hand out the materials to teachers, without much additional information or support. When asked how he got the CBVE Learning Guide, one teacher said that his assistant superintendent just handed it to him and said "Here it is."

Some administrators are purposefully trying to take a cautious approach with teachers regarding the curriculum materials, because they do not want to be seen as forcing a particular curriculum on teachers. One director of vocational education commented that he makes the materials available to teachers and leaves it up to them to decide whether or not to use them, but added that he and his assistant "go around planting seeds and carrying water." Another administrator uses different approaches with individual teachers, depending on their receptivity to new ideas; she gives the materials to teachers she knows will look at them, but "lends" the materials to more resistant teachers and asks for their comments.

Teachers in only one school indicated that there was a seminar to introduce the CBVE materials to school staff. Thus, the dissemination workshops for administrators given at the time that the CBVE Learning Guides are distributed do not seem to be replicated at the district level.

Summary of Key Findings

This section presents the key findings from interviews with teachers, administrators and Department of Education staff about the development and dissemination of the Massachusetts CBVE curriculum materials. Specific recommendations are presented in the last chapter of this report, as part of a synthesis of the major findings of this study.

- The Massachusetts CBVE Learning Guides are written by vocational teachers during summers and after school hours during the school year.
- Teachers described writing the CBVE Learning Guides as a time-consuming process to accomplish within the allotted timeframe. In most cases, it took more than one school year to complete a Learning Guide. Nevertheless, several teachers indicated that it was a positive experience which contributed to their professional development and knowledge of their field.
- All teachers received some type of training about competency-based vocational education and about writing CBVE Learning Guides prior to developing the curricula.
- Teachers praised members of the State Leadership Team for their help and guidance in writing the Learning Guides. However, several teachers felt that the training sessions themselves were not that informative. Instead, they learned about CBVE as they actually began the process of writing the Learning Guides.
- Teachers from two or more districts divided the tasks within one vocational area, so that the writing of each Learning Guide was shared by multiple districts in different parts of the state.
- Discussion of the task listings and division of the labor occurred at the annual summer Professional Development Conference. In nearly all cases, teachers from different schools did not get together again to discuss the development of a particular Learning Guide.
- English teachers in many of the districts that developed the Learning Guide served as editors by proofreading materials for grammatical and spelling mistakes. In some cases, members of the State Leadership Team performed this function.
- Members of the State Leadership Team and their Technical Assistance Team reviewed the CBVE Learning Guides for grammatical and technical errors and to ensure that the guides were consistent with the Massachusetts CBVE format.
- Vocational teachers voiced concern that editing of technical material could not be done adequately by people who were not familiar with the terminology and content of the particular vocational field.
- CBVE Learning Guides are distributed to districts with five or more Chapter 74 programs by the State Leadership Team through dissemination workshops held at Greater Lowell Regional Vocational-Technical School. Other districts may receive Learning Guides by request.

- District administrators attend the dissemination workshops. It is then their responsibility to distribute the CBVE materials to the appropriate teachers or department heads.
- In some districts, the CBVE materials may stay in an administrator's office. In other districts, the materials are handed out to teachers without any information or follow-up. Few districts offer dissemination workshops for teachers.

CHAPTER V

REVIEW OF MASSACHUSETTS CBVE LEARNING GUIDES

This chapter discusses the content and quality of the Massachusetts CBVE Learning Guides. This information comes from three sources: (1) an independent review of ten CBVE Learning Guides; (2) interviews with teachers and administrators who are using or have reviewed these materials; and (3) interviews with Division of Occupational Education team leaders and their staff in four regional education centers.

As described in Chapter II of this report, AAI staff reviewed CBVE Learning Guides in ten areas:

- Accounting and computing;
- Auto mechanics;
- Drafting;
- Electronics technology;
- Food management, production and services;
- Graphic arts;
- Health assistant;
- Machine technology;
- Metal fabrication; and
- Plumbing and pipefitting.

These Learning Guides were selected to be representative of the vocational content areas and the dates of development of the available CBVE Learning Guides. (The dates of development and dissemination are presented in Exhibit I.1 in the first chapter of this report.) In addition, for the Learning Guides disseminated prior to the 1988-89 school year, results from the mail survey were used to select the five Learning Guides utilized by the largest number of school districts.

The Learning Guides were analyzed on the basis of criteria developed by AAI staff and reviewed by staff in the Division of Occupational Education central office. The criteria encompass the principle components of a CBVE Learning Guide specified in the Massachusetts Manual for Competency-Based Vocational Education Curriculum Development. In addition, the criteria include general principles of curriculum development (e.g., clearly written, appropriate for audience, up-to-date) and guidelines for constructing student tests that appear in educational measurement textbooks (e.g., Nitko, 1983; Popham, 1978). The criteria are listed in Appendix B of this report.

This chapter integrates the conclusions from our review of the CBVE Learning Guides with comments about these materials from interviews with vocational teachers, administrators and regional Occupational Education staff. Since there were many common observations about the CBVE curriculum materials, both from our review of individual Learning Guides and from the interviews, this chapter does not attempt a critique of individual CBVE Learning Guides. Moreover, those interviewed referred to Learning Guides in more than just the ten areas of our review. Thus, a synthesis of information about the CBVE Learning Guides across vocational areas is presented with specific examples included to clarify and illustrate the key points.

The first section of the chapter discusses general issues regarding the content and quality of the Massachusetts CBVE Learning Guides. The second section focuses on the specific components of these curriculum materials, such as the task listings, performance objectives, learning activities and criterion-referenced tests. The final section of the chapter summarizes the key findings about the quality of the CBVE Learning Guides.

General Comments about the Massachusetts CBVE Learning Guides

Developing curriculum materials is a difficult and time-consuming process. Staff in one regional education center described curriculum development as one of the hardest things that teachers do. The most difficult part is creating the materials in the first place. Several administrators commended the state for initiating this curriculum development effort and encouraged the continuation of the process. The next step in the process is to improve on the initial effort, based on experience with the materials in the classroom and reactions from those who have reviewed the materials.

In our interviews with teachers and administrators around the state, many of their comments about the quality of the Massachusetts CBVE Learning Guides focused on the need for these materials to be revised, including updating the information presented and the textbooks that are referenced as well as improving the presentation of material. The need for revisions also was pointed out by teachers who had developed the CBVE Learning Guides, and who now see outdated or erroneous information in the materials they wrote. In addition, our own review of the Learning Guides revealed typographical, spelling and grammatical errors that should be corrected.

In this section, we discuss the general issues to be considered in revising the Massachusetts CBVE Learning Guides. In addition, recommendations from teachers and administrators for the process of revision are presented.

Editing Written Materials

Overall, the Learning Guides disseminated most recently are written more clearly and have fewer grammatical and spelling errors than the earlier Learning Guides. An administrator in a regional vocational-technical school also commented that the CBVE materials have improved over the five years of development. We attribute this increased quality to the training and editing done by the State Leadership Team at Greater Lowell Regional Vocational-Technical School, who took on that responsibility in the third year of the state CBVE project. Nevertheless, all of the Learning Guides would benefit from a careful reading by an editor. There are two issues that need to be addressed: the clarity of the writing and the accuracy of the spelling and punctuation.

Quality of Writing. We found that the clarity of the writing in the CBVE Learning Guides varied quite a bit, both within and across Learning Guides. In many cases, sentences are too long and the thoughts conveyed too complex to understand easily. To illustrate the variability within the same CBVE Learning Guide, the following two examples are from instruction sheets in the accounting manual:

A computerized payroll is designed to accurately calculate deductions and net pay, print paychecks and maintain cumulative payroll records for all employees much faster and more accurately than a manual system with the added benefit of being able to generate many special reports based on the data stored in the computer files.

Assets that will be used for a number of years in the operation of business are called plant assets. Plant assets are not bought for purposes of resale to customers in the normal course of business.

The first sentence would be clearer to understand if the information was presented in shorter segments. Such long sentences are difficult to follow and are particularly problematic in curriculum materials for high school students. In addition, many teachers commented that vocational students often are not interested in or have difficulty reading. Thus, the CBVE Learning Guides need to convey information clearly and simply.

The two examples cited above also indicate the need for consistency in the quality of writing within a Learning Guide. As we reviewed the CBVE materials, it became apparent that sections had been written by different individuals. The editing done by individual schools would not have smoothed out these variations. As teachers involved in developing these curriculum materials suggested, perhaps these written pieces should be edited by individuals with knowledge of the technical field, to determine

the best way to present the necessary information. In addition, an edit focused on the content and format of the information could incorporate the best elements in a Learning Guide. For example, some of the Learning Guides present information on instruction sheets in numbered lists with each sentence representing the steps necessary for a specific task. This format is easier to understand than a full paragraph and also forces the writer to break the information into smaller segments.

Spelling and Punctuation. Our review of the CBVE materials revealed a large number of spelling or typographical errors. This was more likely to be true of CBVE Learning Guides developed in the early rather than later phases of the project. However, there were enough errors to warrant a careful proofreading of all of the materials.

In some places, misspellings changed the meaning of the text. For example, students were instructed to "rest" a piece of equipment as opposed to "test" it. In another example, students were told to disassemble a faucet by using a "charmellock" pliers, and then later instructed to reassemble the faucet using the "channel lock" pliers. While the first spelling is probably a case of a typist not being able to read the handwritten word, the mistake could be quite confusing to students.

Similarly, there are errors in punctuation that make the material more difficult to comprehend. The most prevalent errors are missing commas and apostrophes. For example, without a comma after the introductory clause, this sentence from the auto mechanics Learning Guide is difficult to understand on the first reading: "Using a rag clean excess grease around joint and fitting." Examples of missing apostrophes include "adjust the engines idle" and "refer to the manufacturers warranty."

Updating Information and Resources

Occupational Education staff in each of the regional centers visited stressed the need for the CBVE Learning Guides to be updated. By its very nature, vocational education is a constantly changing field. This change happens most quickly in technological areas. Since nearly half of the CBVE Learning Guides are now more than five years old, they need to be brought in line with new technologies, advances in equipment and revised industry standards.

Teachers also pointed out the need for updating the information in the CBVE Learning Guides. An electronics teacher indicated that the CBVE Learning Guide in his field was already out of date because it teaches AC and DC electronics, whereas "today, almost everything is DC." An auto mechanics teacher told us that some of the

information in that CBVE Learning Guide was now outdated because of advances in cars' fuel injection systems and emission control devices, as well as changes in industry standards for transmission fluids.

Another electronics teacher lamented that any curriculum attempting to capture a changing technology was "doomed", since there would always be the need to revise and update materials. In fact, some teachers and regional staff suggested that the materials should be revised every few years. If the materials are to remain useful to teachers, revisions will have to be built into the state project.

Other comments about revisions focused on the textbooks cited in the CBVE Learning Guides. Often, the teachers developing CBVE Learning Guides based the curriculum materials on the textbooks that they were currently using in their classroom. One teacher suggested that, instead, the texts should be selected on the basis of the best and most current books available. However, an auto mechanics teacher explained that even current texts are often outdated by the time the CBVE Learning Guide is disseminated. For example, the CBVE manual in auto mechanics was written in 1982-83 and referenced a 1982 text. However, since the text also took several years to be written, it reflects the state of technology in the field in 1979. These comments suggest that the texts and the information they contain should also be reviewed on a regular basis.

Recommendations for Revising CBVE Curriculum Materials

Several teachers and administrators suggested that the process of revising the existing CBVE Learning Guides should be based on the experiences of a group of teachers. Although only a few teachers were involved in developing the Learning Guides, it was suggested that the process of revision bring in a greater number of teachers.

One teacher who was involved in developing the CBVE Learning Guides recommended that a group of teachers who have been using these curriculum materials should get together and work on what needs to be changed. An administrator concurred with this suggestion, saying that there is now a group of teachers who have used the materials and modified them for their classroom use, and that the state project should build on their experience with the Learning Guides in their particular vocational area.

A teacher who currently uses the Massachusetts CBVE Learning Guide for auto body repair recommended that an advisory group of teachers from across the state should be created to review the CBVE materials. This idea also was proposed by a Team Leader

in one of the regional education centers, who suggested a network of teachers using the Massachusetts CBVE materials could share suggestions for revising the materials. This group could incorporate changes that individual teachers already had made to the CBVE Learning Guides, which would reduce the cost of the revision process and increase the "ownership" of the curriculum materials by teachers across the state.

Other teachers stressed the need to put the Massachusetts CBVE Learning Guides onto computers, to facilitate the revisions now and in the future. In fact, we heard about teachers in at least two districts already putting the CBVE curriculum materials onto computers in their schools. Utilizing the capabilities of computers also provides a relatively inexpensive mechanism for upgrading the quality of the diagrams and illustrations within the Learning Guides as well as an efficient way to check for spelling errors.

Specific Components of Massachusetts CBVE Learning Guides

Teacher and administrator interviews as well as our review of the materials revealed information about the specific components of the CBVE Learning Guides. In this section, we briefly cover the more salient points.

Task Listing

In general, the task listings specifying the tasks and duties of a CBVE Learning Guide have been written in accordance with the CBVE training manual. Most duties are phrased in clauses using present tense participles, such as "servicing the engine system" (auto mechanics), "performing shielded arc welding" (metal fabrication), or "processing payroll information" (accounting and computing). Similarly, most tasks use present tense action verbs, such as "inspect exhaust system" (auto mechanics), "operate high speed drills" (metal fabrication), and "measure and record temperature" (health assistant). However, there are a few examples where a noun ending in "ing" rather than a verb was used to describe a duty (e.g., "accounting for a merchandising business").

Staff in several of the regional centers indicated that they received many requests from district staff for the summary listing of tasks and duties that is at the front of each Massachusetts CBVE Learning Guide. Regional staff feel that these task listings are very useful to vocational teachers and administrators as a check on the content of their vocational curriculum. (The value of these task listing was corroborated in our interviews with vocational teachers; the ways that they used the task listing will be discussed in more detail in Chapter VI of this report, which describes the implementation of CBVE curricula.)

Cover Page and Introduction

Each task of a CBVE Learning Guide begins with a cover page identifying the name of the vocational program and the title of the duty and task to which the Learning Guide pertains. In addition, there is a brief introduction to the task that is generally one or two paragraphs long. In our review, we found that the type of information presented in these introductions varied a good deal, often within the same Learning Guide.

The better introductions use brief, simple sentences that explain the purpose and intent of the task ahead. One example of a short, clear introduction is from the duty for servicing an exhaust system in the CBVE guide for auto mechanics:

An exhaust system is a means of removing burned gases that the engine emits. It is designed to keep exhaust gases from entering the passenger compartment and to help eliminate exhaust noises.

This Learning Guide will assist you in servicing an exhaust system.

An example of an introduction that does not provide a clear purpose for the task also comes from the auto mechanics Learning Guide, in the first task under maintaining and servicing manual transmissions:

All cars and trucks use transmissions. Because of the increase in gasoline prices, many people are buying cars that will give many miles per gallon. Generally, a standard (manual) shift transmission equipped vehicle will give better mileage, resulting in many newer cars built with standard (manual) shift transmissions.

This Learning Guide will assist you in performing a standard transmission replacement.

Another example of an introduction that is short, but does not provide concrete information about why a task is important comes from the more recent CBVE Learning Guide for plumbing and pipefitting, under the task for repairing a faucet:

Dripping faucets are always a concern for the homeowner. Repairing faucets is a very essential part of the plumbing industry. This Learning Guide will assist you in repairing a Delta Faucet.

This introduction would be more helpful and interesting to students if it explained why dripping faucets are a problem, such as increased water costs and stains or damage to sink or surrounding area.

The need to establish the context for a task also was voiced by teachers interviewed. For example, the introductions in the Massachusetts CBVE Learning Guides were criticized by an auto mechanics teacher, who felt that students want to know the reasons why a particular task is important; he stated that the introductions need to provide the context for the task more clearly and to be more imaginative in order to capture students' interest.

Performance Objectives

For each task in a Massachusetts CBVE Learning Guide, there should be a performance objective (i.e., Given... You will...) and a standard for performance assessment (How well...). However, our review of a sample of the CBVE Learning Guides revealed that specific standards for performance are not included for all tasks.

Again, there is variability within the same Learning Guide. For some tasks, the performance standard will be clearly stated, such as "You must pass the knowledge test with 90% accuracy." In other cases, the standard on the Objectives page at the beginning of the task will simply state that "You must pass the knowledge test" or "Your performance will be evaluated using the Performance Standards on page x." In some cases, the specific passing score was indicated at the bottom of the knowledge test, other times it was not specified. The lack of performance standards was noticed in our review of several CBVE Learning Guides, both those developed in the early phases of the project and those developed more recently.

Enabling Objectives

The manual for developing the Massachusetts CBVE Learning Guides states that enabling objectives should break a task down into major activities, following a logical sequence. Our review of the CBVE Learning Guides revealed that in many cases, the enabling objectives do not provide useful or helpful information about the requisite steps in a task.

In some cases, the information is there in another part of the Learning Guide. For example, in the CBVE Learning Guide for plumbing and pipefitting, the enabling objectives under the task to repair a Delta faucet are:

1. Disassemble faucet.
2. Inspect removed faucet parts.
3. Reassemble faucet.

While these three steps do not convey any of the purpose of the act of taking the faucet apart, this information is included in one of the learning activities for this task, where students are instructed to: "Inspect removed faucet parts for damage, wear, or cause of faucet's failure." It would seem that this information would provide a useful guide for students at the start of the task.

In other cases, there seems to be an overuse of verbs such as "identify" and "describe" in enabling objectives. While the manual discusses the need for "doing" and "knowing" enabling objectives, there are instances when the verb "describe" is used when the subtask relates to an activity. Another example from the plumbing and pipefitting curriculum illustrates this point. The enabling objectives for the task to clear stoppage in a culinary sink are:

1. Describe clearing stoppage in a culinary sink using a plunger.
2. Describe clearing stoppage in the grease trap of a culinary sink.
3. Describe clearing stoppage in a culinary sink using an electrically-driven power auger.
4. Clear stoppage in a culinary sink.

The learning activities associated with these enabling objectives indicate that each is an action taken to try to clear the sink stoppage. Thus, it would be more accurate, and possibly more appealing to students, if the enabling objectives focused on the activity (e.g., clear stoppage using a plunger).

Several teachers expressed concern about the way that the CBVE materials divide jobs into tasks and enabling objectives. An auto mechanics teacher felt that this format was "informational" rather than "problem-oriented"; thus the Massachusetts CBVE Learning Guides do not teach students how to diagnose a car's problem or to deal with the "complete" automobile, which is what really happens in a repair shop. Similarly, a carpentry teacher commented that students are not interested in learning separate skills, but rather prefer to work on projects and learn the skills needed for the whole job. For example, he felt that students should be taught all the tasks associated with hanging a door or building a nightstand, rather than working through a series of tasks focused on one element of the job, such as working with power tools.

Learning Activities

The learning activities of the CBVE Learning Guides specify the steps that students should take to gain mastery in a task. Comments gleaned from interviews with teachers and administrators as well as from our review of these materials focus on three aspects of the learning activities: the content of the learning activities; the reference to outside textbooks; and the quality of the diagrams and illustrations.

Content of Learning Activities. Similar to comments about the lack of context within the introductions to the Learning Guides, teachers commented on the lack of information conveyed through the learning activities. An auto mechanics teacher criticized the Learning Guides for being "too specific, not broad-based enough" and described the CBVE learning activities as a "real sharp arrow that's long, but very narrow", suggesting that they covered a long list of tasks or subtasks without providing adequate information for students. Two electronics teachers from different schools said that the Massachusetts CBVE Learning Guide in electronics did not go into enough detail about a task and did not provide adequate technical information for students. Two drafting teachers at different schools cited the need for more practical problems within the CBVE curriculum materials. A plumbing teacher viewed the CBVE materials as a general curriculum guide, but felt that they do not provide enough activities to ensure student mastery.

Reference to Outside Textbooks. Some Learning Guides include information in instruction sheets included in the Learning Guides, while others refer primarily to outside textbooks. The use of textbooks versus instruction sheets also varied across tasks within the same Learning Guide. In some cases, the choice depended on which school developed that section of the Learning Guide. For example, it appeared as though teachers in one school relied primarily on a textbook as a student resource, while teachers in the other school included the necessary information on instruction sheets.

Several district staff were critical of the focus on outside textbooks in the Massachusetts CBVE Learning Guides. In many instances, the learning activities simply tell students to read certain pages in the text and take the self-check. An administrator at a regional vocational-technical school felt that, in effect, the CBVE Learning Guides created an "unnecessary level of paperwork" by referring teachers and students back to a standard text. The repetitive referral between text and self-checks also creates a format that may not be very interesting for students. One electronics teacher explained that "the basic problem with the Massachusetts CBVE materials is that they are boring" for students; he felt that the materials and activities need to be more appealing to reduce the "drudgery" of a competency-based system.

Another difficulty with reliance on outside textbooks is that if schools do not have those textbooks, the usefulness of the CBVE Learning Guide is diminished. One plumbing teacher suggested that the Massachusetts CBVE Learning Guides should be self-contained, rather than include references to outside texts; he felt that the material from these books should be included in the Learning Guides. Students that we talked with also requested that the Learning Guides contain all the necessary reference material, so that a learning packet could be used more easily in the shop.

Diagrams and Illustrations. Our review of the CBVE Learning Guides revealed that the quality of the diagrams and illustrations varied greatly both in terms of the clarity of reproduction and the information presented. In some cases, the drawings and diagrams are well-labeled, simple and clearly reproduced. However, in other cases, it is difficult to read the labels because of the size of the print or the quality of the reproduction. Again, this was something that varied both within and across the Learning Guides.

A number of teachers commented on the illustrations in the Massachusetts CBVE curriculum materials. An auto mechanics teacher suggested that more diagrams should be taken from books and technical manuals, since the hand drawings in the CBVE Learning Guides were not adequate for students. Obviously, the teachers designing the CBVE Learning Guides were limited by budget constraints so that professionally-drawn graphics are not a realistic expectation. However, there are some examples of particularly good diagrams that could be used as models to enhance other Learning Guides. For example, some developers copied drawings from textbooks and cited the reference at the bottom of the page. Where the backgrounds of these drawings are not too dark, these copy clearly and result in professional-looking illustrations. Another option might be to use drawings from local industries and shops. In the CBVE machine technology Learning Guide, for example, some diagrams are courtesy of a local tool company; this manual has some very clear, detailed diagrams of a readings from a Vernier caliper. In our interviews with teachers, we also found that some teachers have begun to revise drawings by relying on computer-graphic programs.

Several teachers commented on the quantity of drawings in the Massachusetts CBVE Learning Guides. In particular, three drafting teachers in different schools each stated that there were not enough drawings in the graphics Learning Guide. In addition, a teacher of heating, ventilation and air conditioning suggested that there should be more practical drawings in that Learning Guide.

Knowledge Tests and Student Self-Checks

In our review of the Learning Guides, it was difficult to determine if the tests are reasonable measures of the material covered, since much of the information relayed to students was accomplished through teacher demonstrations and outside textbooks. Therefore, in this area, our review focused mainly on the extent to which the knowledge tests meet accepted standards for test construction.

Overall, we found that the quality of test items varied, sometimes within the same Learning Guide on tasks written by different teachers. There are examples of tests that are well-written and assess student knowledge in an innovative way. However, there also are many examples of test questions that do not meet basic standards for test construction. In general, the problems were in two categories: (1) fill-in-the-blank items with too many blanks; and (2) multiple choice alternatives that are implausible or inconsistent with the stem. Examples of these two types of problems are presented below.

Fill-in-the-blanks. In a number of Learning Guides, the test items on self-checks and on knowledge tests consist of a sentence with several words left out which students are to complete. However, when the majority of the sentence is blank, the meaning of the question is obscured. Some examples of this type of question are:

Using moistened applicators, the Health Assistant would wipe the patient's _____, _____, _____, and _____ of the mouth. (CBVE for health assistant)

Put on _____ . (CBVE for machine shop)

Clean the _____ and _____ thoroughly. (CBVE for auto mechanics)

To remove a quarter inch chassis bolt or nut you would use a _____. (CBVE for electronics)

Other teachers approached this type of question by asking students a specific question, such as:

What type of paper is most commonly used for proofs? (CBVE for graphic arts)

What tools would you use to insert the socket mounting holes in a chassis? (CBVE for electronics)

Since the partial sentences are sometimes taken directly from the instruction sheets, these fill-in-the-blank questions on self-checks encourage students to look back to the instruction sheet and simply match the words, rather than learn the concept. As an alternative, tests in some CBVE Learning Guides require students to list or number the steps in the order necessary for a task, rather than listing the steps and replacing key words with blanks. A child development teacher felt that the knowledge tests should have more challenging questions. She felt that the current tests were "not well written" and "looking for one-word answers."

Multiple-Choice Tests. In some multiple-choice questions, the grammar of the question stem automatically rules out some of the alternatives as plausible answers. One example of this is when the student must choose a phrase to fill-in a sentence, and one alternative obviously does not fit. In the following question from a test in the CBVE Learning Guide for graphic arts, neither of the incorrect alternatives (a and c) makes sense when replaced in the sentence:

There is _____ difference in the terminology between setting foundry type and photocomposition.

a) a great deal b) little c) entirely different

In this situation, students can get the right answer by logical guesswork. On other tests, the same series of alternatives were used for several questions, so that students could answer a number of questions correctly by process of elimination.

The Massachusetts manual for developing CBVE Learning Guides offers guidelines for teachers writing tests that reflect the accepted standards in educational measurement. However, developing paper-and-pencil tests is a difficult undertaking, on which major industries are based. Thus, it might be advantageous to have the test items in the CBVE Learning Guides revised by someone with expertise in educational measurement. In addition, more creative exercises should be included in these tests and self-checks. For example, tests in some Learning Guides consisted of diagrams to be labeled, a series of tasks to be ordered, or hypothetical problems for students to solve or diagnose.

Summary of Key Findings

In general, the Massachusetts CBVE Learning Guides follow the format and guidelines described in the manual for developing CBVE materials. However, our review of ten CBVE Learning Guides and interviews with vocational teachers and administrators

familiar with these materials reveal several ways that these curriculum materials could be improved:

- All of the CBVE Learning Guides would benefit from revisions to update both the information and references included; to improve the clarity of the writing; and to correct errors in spelling and punctuation.
- In particular, the task introductions and instruction sheets should provide information specific to the context and purpose of tasks to be performed, in language and style that is clear and easily understood by high school students.
- Standards for attaining mastery should be specified for all performance objectives.
- Diagrams and illustrations should be well-labeled and clearly reproduced. Where possible, the quality of the drawings should be enhanced by incorporating material from textbooks or trade manuals, professional material or computer-generated graphics.
- Knowledge tests and student self-checks should be revised to meet accepted standards for test construction. Fill-in-the-blank questions should be replaced with exercises that require more student thought, such as labeling diagrams, ordering the necessary steps in a task, or diagnosing hypothetical problems.

CHAPTER VI

USE OF CBVE CURRICULUM MATERIALS IN VOCATIONAL CLASSROOMS

This chapter describes the ways in which competency-based curriculum materials are used in vocational classrooms in Massachusetts. The implementation of the Massachusetts CBVE Learning Guides and the Math/Science Competencies as well as other types of competency-based materials are discussed. In contrast to Chapter IV, which described results of a survey about the use of CBVE materials at the district level, this chapter focuses on the ways in which individual teachers use these materials in their classrooms.

The information presented comes primarily from interviews with vocational teachers obtained during site visits to ten schools across the state. The districts visited and the design of the site visits are described in Chapter II of this report. Copies of the interview guides are included in Appendix D. Teachers' comments about the use of competency-based curriculum materials are supplemented by interview data from district administrators and Division of Occupational Education regional staff.

The first section of this chapter summarizes the different ways in which vocational teachers use the Massachusetts CBVE Learning Guides, such as teacher references and student instructional materials, as well as how other types of curriculum materials are used in addition to or instead of the CBVE Learning Guides. The second section discusses the use of the Massachusetts Math/Science Competencies. The third section describes the factors that facilitate implementation of the Massachusetts CBVE Learning Guides, followed by a discussion of the barriers to use of these curriculum materials. The last section of the chapter summarizes the key issues related to implementation.

Use of CBVE Curriculum Materials in Vocational Classrooms

Based on interviews with nearly 50 vocational teachers across the state, the use of CBVE curriculum materials can be categorized in one of five ways:

- Use Massachusetts CBVE Learning Guides as student instructional materials;
- Use Massachusetts CBVE Learning Guides only as teacher resource, but do not hand out materials to students;
- Use Massachusetts CBVE Learning Guides as a starting point for other curriculum development;

- Use other type of competency-based curriculum, such as from Oklahoma, Mid-America or a professional trade organization (e.g., NTMA); or
- Do not use any type of competency-based approach to instruction.

Exhibit 6.1 arrays these five categories according to whether teachers use the Massachusetts CBVE Learning Guides in any way since that is a key question of this study. It is important to point out that we purposefully selected the ten schools for the site visits to maximize the likelihood that we would interview teachers who use the Massachusetts CBVE Learning Guides as well as teachers who do not use these materials. Thus, it would be misleading to talk about the number of teachers in any of these categories. Instead, the discussion focuses on the ways that the materials are used, the reasons for not using them, and the factors that seem to facilitate or impede implementation.

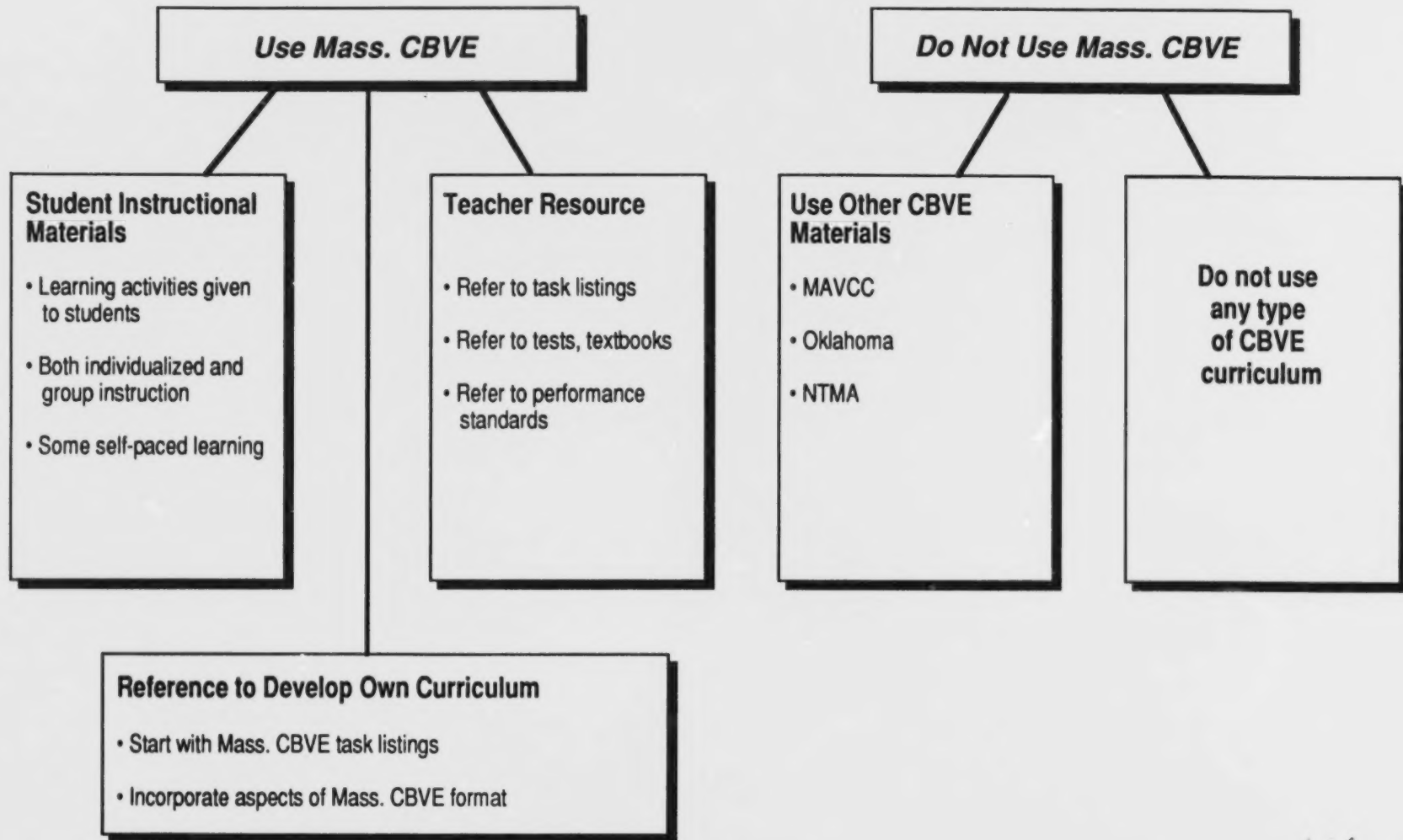
Massachusetts CBVE Learning Guides as Instructional Materials

Teachers in four of the schools that we visited use the Massachusetts CBVE materials as classroom instructional activities and hand out either entire learning packets or sections of the Learning Guides to their students. However, student learning was not always individualized or self-paced, which are two characteristics of competency-based instruction. The following examples reflect the different ways in which the Massachusetts CBVE Learning Guides are used.

Self-Paced Learning Utilizing Complete Learning Guides. One example of a classroom with a fully-implemented CBVE curriculum is taught by an auto mechanics shop teacher who has organized his classroom activities entirely around the Massachusetts CBVE Learning Guide. The classroom space includes a small room adjacent to the shop area with tables where students can read, a bookcase holding the resources listed in the Learning Guide, and models of automotive components. The room is lined with windows so that students and the instructor can see what is going on in the shop area. The instructor feels that the CBVE manual fits well with the goals of the shop class, which focuses on learning specific skills. He emphasized that this does not take the place of theory class, where the emphasis is on the theory of how a car works. (The automotive theory teacher for this group of students does not currently use the Massachusetts CBVE Learning Guide.)

Exhibit 6.1

Use of Massachusetts CBVE Learning Guides by Vocational Teachers



The ninth grade students in this class begin the course on the same task, but then progress at their own pace through the Learning Guides. The teacher indicated that he might give ten different demonstrations for students who are at different places in the Learning Guide. He feels that this is a bonus for the students who might be working nearby and hear his demonstration for the second or third time, since this "can't help but improve their comprehension." Students take the performance test when they feel they are ready. Their performance is rated on a four-point scale, with the highest rating indicating that they are proficient at a task and can work independently. Students can take the performance test more than once if they want to upgrade their rating, since students cannot do production work on a task until they are proficient. After students complete one learning packet, the teacher gives them a test from the automotive trade, as a check on their comprehension of the material.

In an auto mechanics class for ninth graders in another school, the shop and related classes are taught by the same instructor, who uses the Massachusetts CBVE Learning Guide during related instruction. The teacher introduces a general topic in a lecture to all students, then hands out the corresponding Learning Guides. Students work through the activities at their own speed and are given copies of the Learning Guides so that they also can work on the materials at home. The teacher supplements the self-checks in the Learning Guides with his own quizzes, since he feels that some students read through the material too quickly, looking only for the answers to the self-checks. During the shop week, students work together in small groups on the basis of where they are in the Learning Guides. This instructor finds that students who have mastered a particular task will help their classmates who are working in that area. In this way, the competency-based approach encourages teamwork and gives students a sense of competence. In addition, students become more involved in their own learning.

Use Selected Parts of CBVE Learning Guides. In some classrooms, teachers use portions of the Massachusetts CBVE curriculum materials, selecting either specific components of the Learning Guides or materials for specific tasks. For example, a child development instructor describes using "bits and pieces" of the Massachusetts CBVE materials. She feels that some units, such as child care careers, are stronger than others. In these areas, she gives students the reading references and the instruction sheets. She also selects the knowledge tests for many of the tasks.

In another school, an electronics teacher distributes to his students the Massachusetts CBVE materials for selected tasks. For other tasks, he has modified the Massachusetts materials or developed his own instructional activities for students.

Teachers and administrators also described using the Massachusetts CBVE Learning Guides to assist instruction in specific learning situations. For example, staff in the regional education centers as well as vocational teachers and administrators indicated that CBVE Learning Guides are useful instructional tools for resource room and special education teachers to help vocational students in specific content areas. Without these specific examples of what special needs students are learning in vocational class, it is difficult for support teachers to provide vocationally-specific instruction. The Learning Guides also offer well-defined instructional materials for students who are out of school due to sickness or hospitalization.

Group Instruction. Some teachers give students copies of the Massachusetts CBVE Learning Guides, but incorporate these materials into more traditional group instruction. For example, an instructor of heating, ventilation and air conditioning who teaches both the shop and related classes distributes learning packets, but students stay together on the same tasks during related instruction. During shop class, all of the students work on the two or three tasks that were covered in the related instruction.

A drafting teacher has divided the tasks in the Learning Guide according to their appropriateness for related or shop class. During related class, he presents topics through lectures and demonstrations and sets aside some classroom time for students to work through the corresponding Learning Guide. During shop class, he reviews the materials with students who then work together in small groups. In both settings, all students work on the same tasks. The teacher supplements the Massachusetts CBVE materials with his own illustrations and drafting exercises. In addition, if the learning activities refer to an outside textbook, he copies the necessary pages and includes them in the learning packets given to students.

Massachusetts CBVE Learning Guides as Teacher Resource

Distribute or Adapt Materials. A number of teachers described using the Massachusetts CBVE curriculum materials as one curriculum resource among many they refer to in their teaching. Among this group of teachers, there was variation in the extent to which specific components of the Learning Guides are accessed. Some teachers refer only to the task listings as a guide for their teaching, while others adapt the learning activities and tests for use with their students. In all of these cases, the method of teaching appeared to be based on group instruction rather than individualized or self-paced learning.

One example of incorporating and adapting the CBVE materials is a machine shop teacher who had tried to distribute the CBVE Learning Guides to his students, but found that they were difficult for students to understand. Now, using the materials as a teacher resource, he modifies the information on the instruction sheets and learning activities by adding more background information to the instruction sheets and presenting the material in a simpler way. He finds this approach works well in both the shop and related classes. In addition, this process of revision helps him consider the needs of his students. In fact, he commented that even if all of the revisions that he has made were incorporated into the Massachusetts CBVE materials, he would not want to hand them out to students as a self-contained resource, because teaching "wouldn't be fun anymore."

An auto mechanics teacher in another school uses some of the handouts in the Massachusetts Learning Guide to supplement his curriculum. In addition, he refers to the task listing, but selects the tasks that he feels are suited to the ability level of his students. He does not use the tests in the Massachusetts Learning Guide, because he feels that they are "too involved" for his students. He also uses competency-based materials developed by Oklahoma in much the same way as the Massachusetts CBVE Learning Guides, as supplements to the textbook and audio-visual materials that form the core of his curriculum.

Task Listings as Curriculum Reference. A drafting teacher indicated that he uses the Massachusetts CBVE materials primarily for his own review and as a check against other teacher resources. However, it seemed that his use of the Learning Guides was restricted mainly to the task listing, which he said he referred to when developing his course outline.

An assistant director in another school also described teachers' use of the Massachusetts CBVE materials as focused primarily on the task listings. In this school, the task listings have been used to develop progress charts for students and competency lists indicating the major skill areas in which students are competent. The competency lists will be printed on the back of a certificate that students receive at graduation. This administrator indicated that the school is moving in the direction of a competency-based curriculum, which he described as requiring task listings, specified steps for student learning, and measurable results.

Massachusetts CBVE as Reference for Curriculum Development

District-Level Initiatives. Several districts have decided to develop their own competency-based curriculum materials. In some cases, this decision predated the state CBVE project. For example, Occupational Education staff in the regional centers described districts that were interested in competency-based vocational education before the Massachusetts CBVE Learning Guides were developed. This also was one reason indicated by a number of districts on the mail survey as to why the Massachusetts CBVE materials are not used in the district.

Among the districts that we visited, the decision to develop competency-based vocational curriculum materials came after the initiation of the state CBVE project. At present, most of these districts are working on developing task listings and student instructional materials. The Massachusetts CBVE Learning Guides served as the starting point for curriculum development. In this way, the Massachusetts CBVE materials have encouraged the process of curriculum development. For this reason, a superintendent-director of a regional vocational-technical school commended the state for getting involved in curriculum development. An assistant director of another school felt strongly that getting teachers to think about what they teach has merit as a process, separate from the end product.

One district has embarked on a four-year plan to develop their own competency-based vocational curriculum, feeling strongly that curriculum development should be a local initiative. With the support of the superintendent, the school board allocated \$200,000 for curriculum development and teacher in-service training in competency-based education. The curriculum materials include task listings, performance objectives and performance tests similar to the Massachusetts model, but substantially shorter. These materials are used only in the shop classes, with related instruction focusing on the theory relevant to a particular curriculum. According to the teachers we interviewed, these materials help to structure their curriculum and articulate students' competencies. However, in both shop and related classes, much of the teaching is in a large-group rather than individualized format.

Another district has just begun a three-year effort to develop competency-based curricula. In this case, the Massachusetts CBVE Learning Guides provided the impetus for curriculum reform in the district. The assistant director saw the Massachusetts CBVE materials as offering an organizational structure that would unify the curriculum across vocational areas. This year, vocational teachers are writing task lists, using the Massachusetts materials as references and adapting them to local

employment opportunities. Teachers are receiving technical assistance (from an administrator in another district that is also developing their own competency-based curriculum), but do not get any financial compensation or release time to work on the curriculum development. Next year, the effort will focus on writing performance standards. In the end, the assistant director envisions a manual with task listings, performance standards and specific instructional activities. However, at present, none of the teachers interviewed are using a competency-based curriculum.

Two other districts also are just beginning to work on local task listings for their vocational curriculum. One district offered workshops to teachers two years ago and is now completing task listings for vocational and academic areas; in future years, teachers will link activities and resources to teach these tasks.

The other district is in the preliminary stages of implementing a competency-based curriculum. After reviewing the Massachusetts CBVE Learning Guides, the director of occupational education is working with a special education teacher to develop task lists and certificates of competency that will identify students' accomplishments. The task listings in the Massachusetts CBVE Learning Guides are used for comparison. In this district, the effort is primarily at the administrative level this year. Most of the teachers interviewed had little familiarity with the Massachusetts CBVE curricula. Taking a very cautious approach to revising curricula, the district's plan is to get individual classroom teachers more involved in the development of the task listings next year.

Teacher-level Initiatives. A few teachers that we interviewed described extensive efforts to develop their own competency-based curricula. One auto mechanics teacher used the Massachusetts CBVE Learning Guide when it was first disseminated and thought it was the "best thing around." Eventually, he felt that the materials needed to be improved. Now, he is in the process of developing a competency-based curriculum that is being pilot-tested by the Massachusetts Department of Corrections. These materials have similar components to the Massachusetts CBVE Learning Guides (e.g., objectives, self-checks), but a substantially different format. He has simplified the reading level of the materials, condensed the presentation and incorporated illustrations from automotive manuals. This curriculum is being edited and printed by a commercial company that distributes competency-based training materials along with their automotive equipment and teaching models.

An auto mechanics teacher in another school has developed his own competency-based materials over the three years he has been teaching. He learned

about competency-based vocational education in the courses he took for teacher approval. Once he began teaching, he tried to implement the Massachusetts CBVE Learning Guides, but found that they were difficult to use with his students. He has now developed a full set of student activities that simplify the information by breaking it down into smaller segments. In addition, his materials include more visual and "hands on" activities. He has used the Massachusetts task listing as a starting point, added some of the objectives and diagrams from the Oklahoma competency-based materials, and developed many of his own exercises and illustrations with the aid of a computer-graphics program.

A culinary arts instructor spent nearly 100 hours last summer reformatting his previous curriculum to meet the standards of a competency-based curriculum. Using the format of the Massachusetts CBVE Learning Guides, he has developed "research questions", instruction sheets, knowledge tests, readings, and recipes for student learning activities. Altogether, he has created sixteen learning packets that ninth grade students work on individually. The instructor received college credit for this work, but was not paid for the effort, which he described as "overwhelming."

Use Other Types of CBVE Materials

One of the districts we visited decided to reorganize their vocational curriculum seven or eight years ago. At that time, they purchased some of the competency-based materials available from Oklahoma and the Mid-America Vocational Curriculum Consortium (MAVCC). In that district, there are still teachers who rely on these materials. For example, a culinary arts teacher uses the task outlines and the student handouts from the MAVCC curriculum. A drafting teacher incorporates student handouts from the Oklahoma materials into his vocational classes. Teachers in this and other districts use components of the MAVCC or Oklahoma materials because they like the overhead slides and the professional quality of the diagrams and illustrations. However, in most of these classrooms, these materials are used for group instruction.

In another district, the machine shop teacher uses the competency-based materials from the National Tool and Machine Association (NTMA). He began using the NTMA materials with an adult evening program and liked them so much that he started using them in his high school classes two years ago. He has reorganized the NTMA materials to match the areas taught in grades ten through twelve. Handouts are distributed to students in the related class, along with other materials that the teacher has developed. Students work as a group on the same task during related instruction, and

break into small groups during shop class. In his opinion, the Massachusetts CBVE Learning Guide is "too cumbersome." The NTMA materials have a simpler competency profile and present the task objectives, introduction and resources more concisely. In general, he finds these materials more "teacher-oriented." In addition, he receives updated materials and information every few months, so that he is always able to keep pace with industry.

Do Not Use Competency-Based Materials

As described above, many teachers in districts that are just initiating curriculum reform efforts do not currently use any type of competency-based approach to instruction. In addition, even teachers in districts with some activity in competency-based instruction have not incorporated these materials into their vocational classes. Most of these teachers in the latter category have a curriculum that they prefer not to change.

Some teachers do not believe in the philosophy of competency-based instruction. For example, a drafting teacher who has been teaching three years stated that he "saw no benefit in having students stay with a task until mastery", indicating that students will get bored. Similarly, an auto mechanics instructor in another school who has been teaching for 31 years said that he preferred to teach in the "spiral method", where the easier tasks are presented to students in a number of areas so that students do not get stuck on one task. A child development teacher and a health teacher in two different schools both commented that the material in the CBVE Learning Guides is "all theory", and that students in their fields have to learn the necessary skills by working directly with people.

Use of Math/Science Competencies in Vocational Classrooms

Very few of the teachers we interviewed refer to the Math/Science Competencies in their teaching. In fact, quite a few vocational teachers had never heard of these materials. Others had heard of the Math/Science Competencies but had not seen the manuals.

These findings are consistent with the survey results, which indicated that only 14% of the districts with Chapter 74 programs use the Math/Science competencies. During the site visits, it generally seemed that administrators were more familiar with the Math/Science Competencies than were teachers. Thus, it seems likely that in the small proportion of districts in the survey that reported using these materials, they are used by administrators as a reference rather than by teachers as an instructional tool.

Indeed, a few teachers told us that these materials are not useful to them in their present state. An instructor of auto mechanics theory classes reported that these manuals are not helpful because the tasks are not broken down into specific problems. An auto mechanics teacher in another school concurred, saying that he found the manual too abstract and "philosophical." This teacher and a carpentry teacher in another school both felt that they did not need to be told what math skills were required for students in their field. The auto mechanics teacher thought that the manuals might be more appropriate for academic teachers, although in his school the only copy was given to the vocational teacher.

Since we only spoke with administrators and vocational teachers, it is quite possible that some academic teachers do find the Math/Science Competencies useful. As described in the first chapter of this report, work is currently underway to develop specific math problems and science activities to expand on the matrices of competencies. However, a few vocational teachers expressed concern that it was not realistic to expect academic teachers to teach math within the context of specific vocational areas when they have students from several different vocational areas in their classes. An administrator indicated that math instruction should focus on general skills rather than be linked to particular occupations.

Factors that Facilitate Implementation

Based on the ten site visits to schools and interviews with teachers and administrators, a number of factors emerged that appear to facilitate the use of the Massachusetts CBVE Learning Guides in vocational classrooms. These factors, listed below, include characteristics common to the schools or teachers using the Massachusetts CBVE Learning Guides:

- a "key player" in the school who is knowledgeable about curriculum development, enthusiastic about the benefits of competency-based instruction, and can provide information and support to teachers;
- new teachers receptive to curriculum ideas;
- a new vocational program or an administrative interest in improving an existing program area;
- implementation of the CBVE program with an incoming group of ninth grade students; and
- technical assistance workshops or technical support to adapt and implement the CBVE Learning Guides.

Each of these factors is discussed in more detail below.

"Key Player" in the School

The three districts that we visited where a number of teachers are using the Massachusetts CBVE Learning Guides as self-paced classroom instructional materials each have an individual whose primary responsibility is to promote competency-based vocational education and curriculum development. In one district, the key player is a curriculum coordinator recently hired by a new superintendent-director. In the other two districts, the individuals are teachers who have been involved in the development of the Massachusetts CBVE materials and are now moving out of the classroom to coordinate the use of Massachusetts CBVE Learning Guides in their schools.

Each of these three individuals is enthusiastic about the benefits of competency-based curricula. In addition, they seem to be sensitive to teachers' reluctance to try new materials and willing to work with teachers to adapt the Massachusetts materials for their classrooms. As the superintendent-director in one of these districts commented, "You can't force curriculum on teachers. It's important to have one person... a teacher... who's really enthused about CBVE." In two of the districts, these individuals have additional support for their efforts, including another teacher who can substitute for classroom teachers so that they are free to work on adapting the CBVE materials.

In another district just beginning a switch to competency-based instruction, two teachers were identified as the guiding force for this curriculum reform effort: one was involved in the development of a Massachusetts CBVE Learning Guide, and the other was previously involved in vocational training programs in industry. These two teachers began working together to get teachers more involved in competency-based education and proposed to the administration that the district's curriculum be revised using a competency-based model.

New teachers

Many of the teachers who were most enthusiastic about the Massachusetts CBVE Learning Guides and were actively incorporating them into their classrooms were new to teaching. These instructors commented that they knew what to teach, since they had been working in the trade, but they were not sure of how or when to teach the skills

required. One auto mechanics teacher commented that the Massachusetts CBVE materials "took the weight off" starting to teach, since the materials showed him where to begin and allowed him to "get right into teaching." A new auto mechanics teacher in another school concurred, indicating that the Massachusetts CBVE Learning Guide helped get him started by providing the framework for what he was to teach. A machine shop teacher started to develop his own curriculum and realized the Massachusetts curriculum "had everything he needed."

The receptiveness of new teachers also was voiced by administrators and regional education staff. One administrator commented that it is easier to get new teachers involved in CBVE because they are not "set in their ways" about teaching. A curriculum coordinator indicated that new teachers are more willing to take a look at different types of curriculum materials. The Massachusetts CBVE project should capitalize on this openness by targeting technical assistance about implementing CBVE Learning Guides to new teachers.

A member of the State Leadership Team commented that newer teachers are more open to CBVE because they have not put a lot of effort into developing their own curriculum yet. This notion of the effort already invested in a curriculum was voiced by several veteran teachers who indicated that they liked the particular curriculum that they had been using for a number of years.

Programs Being Started or Improved

In a few cases, the Massachusetts CBVE materials are being used in programs that have just began at a school. For example, a home economics teacher who had been teaching for 20 years selected the Massachusetts CBVE Learning Guide for child development assistants when she initiated that program this year. In another school, a new teacher instituting a program in heating, ventilation and air conditioning turned to the Massachusetts CBVE curriculum in that area.

In addition, some districts consider the Massachusetts competency-based materials when they are trying to upgrade their curricula. For example, an auto mechanics teacher indicated that teachers in his school are encouraged to use competency-based curricula since the school is coming up for accreditation soon. Similarly, a member of the State Leadership Team indicated that the Massachusetts CBVE materials often are considered by administrators who are interested in upgrading their curricula after a Chapter 74 audit. Regional education staff indicated that they encourage districts to implement CBVE curricula in program areas they are trying to improve.

Starting with Ninth Grade Students

Most of the teachers who are successfully implementing the Massachusetts CBVE Learning Guides have begun the individualized instruction with an incoming group of ninth grade students. This strategy also is recommended in the workshops about implementing CBVE curricula conducted by members of the State Leadership Team. The rationale is that it is easier to initiate a new instructional approach at the beginning of the vocational program, rather than one or two years into it. For example, one auto body repair teacher commented that he has been able to use the Massachusetts CBVE materials with his ninth and tenth graders, but he cannot start the program with twelfth graders because the material is repetitious for them.

In addition, the format of most vocational programs makes it difficult to have juniors and seniors working on the learning activities. As staff in one regional education center explained, juniors and seniors in many programs "go out on co-op" to work in the field and are not in the classroom. In other programs, juniors and seniors focus on production or "live" work, doing jobs for clients outside of the school rather than working on instructional models.

Technical Assistance

A number of teachers who are using the Massachusetts CBVE Learning Guide as instructional materials have received technical assistance from members of the State Leadership Team. In addition, districts in the process of developing their own curriculum materials mentioned the important role of technical assistance. The workshops led by Ray Larivee and David LaPierre were specifically mentioned as particularly helpful in learning how the Massachusetts CBVE materials can be adapted for individual district's use.

Similar to the role of a "key player" in the school, these workshops seem to be important in helping individual teachers better understand the CBVE materials. Staff in one regional center commented that many teachers are interested in these curriculum materials, but need someone to work with them on implementation. One teacher suggested that summer workshops should be conducted so that teachers can work on adapting the CBVE materials to their local curriculum resources.

Barriers to Implementation

The teachers and administrators interviewed raised a number of issues that appear to impede the implementation of the Massachusetts CBVE Learning Guides. These barriers encompass the following issues:

- the reading ability and learning style of vocational students;
- teachers' perceptions of the format and content of the CBVE Learning Guides;
- the organization of vocational instruction and facilities; and
- administrative support and resources for curriculum development.

While these factors are not necessarily under the purview of the Department of Education to change, they do offer suggestions for future technical assistance efforts. Each of these issues is discussed in more detail below and, wherever possible, recommendations made by teachers and administrators to address these issues are presented.

Students' Reading Ability and Learning Style

Many teachers and administrators commented on the heavy emphasis on reading in the Massachusetts CBVE Learning Guides. An assistant director of vocational education stated that many students in regional vocational-technical schools have difficulty with reading and writing tasks, which is often precisely the reason that they are in a vocational program. Yet, he argued, a substantial proportion of the Massachusetts CBVE Learning Guides rely on traditional reading and test-taking activities. Staff in one regional center described vocational students as more interested in "doing" than "reading." Similarly, a teacher indicated that vocational students are "visually oriented -- they need to handle materials, use tools, see results"; thus the Massachusetts CBVE Learning Guides "give students information in the way that they're least likely to comprehend." An administrator in another school concurred by saying that many vocational students cannot show their knowledge by reciting the steps required in a brake job, but they can do a brake job.

These criticisms of the amount of reading required in the CBVE Learning Guides are countered by some of the teachers who are using these curriculum materials in their vocational classes. A graphic arts teacher involved in developing this CBVE

curriculum acknowledged that his students "are not readers." However, he adjusts to their learning style by limiting the amount of reading material that he hands out to students at one time. In this way, students "can see there's an end to it." In fact, he feels that the CBVE Learning Guides actually help students who are reluctant to read by specifying exactly what is to be read. A teacher involved in developing the CBVE Learning Guide for auto mechanics asserts that since students have to be able to read technical manuals in all of the trades, "we do a disservice to students by letting them get away without reading." Another teacher suggests that instructors should work with individual students who have difficulty reading or give the CBVE Learning Guides to resource room teachers. He stated that, used in this way, the CBVE materials can help students become better readers.

A related challenge for the implementation of competency-based materials is the high proportion of students with special needs who are enrolled in vocational programs. Occupational Education staff in one regional center estimated that 25-30% of vocational students have special needs, with as many as 40-50% on an IEP in some schools. At a regional vocational-technical school, an administrator reported that 80% of the entering freshman were eligible for Chapter I because of their low reading scores. One auto mechanics teacher indicated that 60% of his students have IEPs; while another auto mechanics teacher in a different school reported that 40% of his students are in special education.

The dilemma articulated by these teachers is that one premise of CBVE states that any student can learn anything, given enough time. Thus, students should be allowed to stay with a task until mastery. However, as one teacher commented, "there's just not enough time for some of these kids." One auto mechanics teacher reported that some students in his class can overhaul an automatic transmission, while others can only change a tire. Another auto mechanics teacher was frustrated by the fact that some of his students still could not mount and dismount a tire after two years of instruction. One teacher asked, "How much time can a student spend on the same task if mastery isn't happening?". Another teacher indicated that, for some students who are not very motivated to stay in school, keeping students on a task until mastery becomes frustrating and increases the likelihood that students will drop out of school.

Based on these comments, a possible topic of future technical assistance could be strategies that teachers can use when implementing competency-based instruction with special needs and at-risk students. While workshops and newsletter articles on these topics have been developed, the information may not be reaching enough teachers around the state.

Teachers' Perceptions about CBVE

Teachers discussed aspects of the CBVE materials related to their format and content that were barriers to implementation. Some of these perceptions do not accurately characterize competency-based instruction. In this section, these reactions and comments are described, followed by recommendations to address the misconceptions.

Format of CBVE Learning Guides. One of the reasons that teachers are not using the Massachusetts CBVE Learning Guides as instructional materials seems to be due to their initial reaction to the size of the materials. A number of administrators, as well as staff in the regional centers, indicated that teachers found the materials "overwhelming." For example, several teachers and administrators pointed out that the CBVE Learning Guide for auto mechanics spans five volumes. One administrator indicated that the materials are "cumbersome" for teachers and could be streamlined by reducing the amount of wasted space on many of the pages.

In some cases, these reactions seem to be a result of comparing the Massachusetts CBVE Learning Guides to other competency-based materials. For example, the curriculum materials from Oklahoma and MAVCC are teacher-directed rather than student-directed and rely on heavy usage of overhead slides and other types of media. Thus, the printed materials themselves appear much more streamlined. A drafting teacher commented that he found the Massachusetts Learning Guide difficult to understand and follow, particularly in contrast to the format of the MAVCC materials.

The Massachusetts CBVE materials are modeled after a competency-based curriculum developed at Ridge Vocational-Technical Center in Florida. This format and other student-based curricula, such as those developed by the state of Pennsylvania, are, by design, more detailed and are intended to provide learning activities and information for students. In Chapter V, we reported teachers' comments about the need to make the Massachusetts CBVE Learning Guides more self-contained, by including more instructional information and reducing the reliance on outside textbooks. Considering those earlier comments in light of teachers' reactions to the present size of the Learning Guides, the state needs to weigh the trade-offs involved in creating curriculum materials that stand alone as complete instructional materials.

It is interesting to note that a few teachers who began working with teacher-directed curricula expressed dissatisfaction with those materials. A drafting teacher and

an auto mechanics teacher in two different schools each commented that the Oklahoma and Mid-America materials are not relevant for shop classes, but rather focus on issues of theory. A merchandising teacher indicated that the Oklahoma materials have too much of a basis in agriculture, which is not relevant for students in Massachusetts.

Characteristics of Competency-Based Instruction. A number of vocational teachers indicated that they were not interested in the Massachusetts CBVE model because they are already using a competency-based approach. This rationale might have been due to a reluctance to change from their current curriculum, but it also seems to reflect some general misconceptions about competency-based vocational education. In particular, some district staff have a much narrower definition of CBVE than the one guiding the Massachusetts CBVE curriculum reform effort. For example, an auto mechanics teacher indicated that the approach that he has been using for the last fourteen years is competency-based, since work is presented in a job listing format and students are graded on their knowledge of the task. Other teachers pointed to their use of progress record charts as evidence that they already use a competency-based approach. While both of these examples incorporate some of the elements of competency-based education, neither allows for individualized instruction or presents performance standards at the outset of a learning activity. As one teacher commented, simply considering task listings as competency-based instruction is "selling it short."

Administrators also seem to be lacking information about the specifics of CBVE. One superintendent-director stated that CBVE is really the same as "the way they used to do it." Another superintendent-director reported that this curriculum reform effort was "really nothing new", although he expressed a desire to know more about CBVE.

As a few teachers and administrators indicated, some teachers may feel threatened by competency-based curriculum materials and concerned that they are no longer needed in the classroom. According to one administrator, teachers feel guilty when "students are learning without them" so that the change in the teacher's role in a competency-based classroom is difficult for some teachers to accept. An auto body repair teacher stated that some of his colleagues think that the teacher "hands students the Learning Guides and goes away", but, he continued, "actually it's not less teaching... it's really more teaching, more individualized." Still, an electronics teacher who does not use the Massachusetts CBVE materials in his classroom explained that this was because he prefers to be more involved in his class.

As these comments from teachers and administrators suggest, additional information about the goals and implementation of the CBVE Learning Guides is clearly still needed. Several teachers recommended that technical assistance workshops should focus on specific vocational areas. One auto body repair teacher who attended a general workshop on CBVE felt that a session directed to what CBVE means for his particular vocational area would have been much more helpful. Using the Automotive Technology Day as an example, several teachers suggested that there should be more professional days organized by trade areas. By focusing on a single vocational area, these workshops also can encourage communication between teachers about the specifics of competency-based vocational education in their classrooms.

Other suggestions for additional information about CBVE include developing courses for veteran teachers similar to the ones offered to new teachers. One teacher described how, as part of a class for teacher approval, a group of new teachers spent an evening in his auto mechanics shop using the Massachusetts CBVE Learning Guide. By progressing through the learning activities as students would, these teachers not only experienced firsthand the classroom methods of self-paced instruction, but also could see the value of this approach in mastering vocational skills. Similarly, teachers stressed the importance of seeing model classrooms that are currently implementing CBVE instruction. For example, teachers from sixteen districts visited CBVE classrooms at Cape Cod Regional Vocational-Technical School during the 1988-89 school year. This offers an opportunity for teachers to view CBVE "in action", in order to better understand its components.

Organization of Vocational Instruction

Some of the challenges to implementing a competency-based curriculum are related to the way that vocational education is structured in districts across the state. These include the division of instruction into theory and shop class, the deadlines of a production shop and managing a group of students working on different machinery. Each of these issues is discussed below.

Theory versus Shop Class. Some teachers expressed difficulty implementing the Learning Guides within a structure that separates shop and theory classes. In most of the schools we visited, vocational students alternate between one week of shop classes and one week of theory and academic instruction. Since many tasks in a Learning Guide include both information or theoretical knowledge as well as activities to practice vocational skills, the curriculum materials appear to span both theory and shop classes.

As one teacher explained, "the tasks that begin with 'identify' and 'describe' are theory, those that begin with 'perform' are for shop." The relationship of tasks to theory and shop is a particular issue where these two classes are taught by different teachers.

Teachers address this issue in different ways. Where the shop and related classes are taught by the same instructor, there is an attempt to divide the activities in the Learning Guides as appropriate for either shop or related instruction. For example, as described earlier in this chapter, some teachers have students work through tasks as a group during related instruction and then the class works on these same skills during the shop week. However, where different instructors teach the shop and theory classes, the CBVE Learning Guides are more likely to be used in the shop class. In these cases, related instruction was not necessarily linked to the tasks performed in the shop.

In one school, an administrator and his staff are trying to coordinate instruction between the shop and related teachers. Their goal is to have the student competency checklists shared by the shop and related teachers and moved between the two classes at the end of each week. In this way, both shop and related classes can be focused on the same tasks.

Production Shops. A number of teachers indicated that the Massachusetts CBVE materials would not work in their classrooms because their classes are set up as a production shop, where the tasks performed during class are dictated by the work that comes into the shop. As a graphic arts teacher described, instead of having students work through a series of tasks related to the same skills, there is a division of labor within a single job, so the individualized instruction will not work. In addition, he indicated that the time deadline of the job is in conflict with self-paced learning. Some classes may not take in work from outside of the school, but still organize their shop classes around projects. As a machine technology teacher explained, "there may be six or seven steps to center drilling...we teach students how to do a job from start to finish...not all possible ways to do one thing." A carpentry teacher commented that students in his class are interested in seeing a finished project, not doing individual tasks.

One district has adapted their instruction within a production shop to accommodate CBVE. While freshman and juniors used to work on jobs together, the ninth grade students now work through the CBVE Learning Guides until they become competent. Production work is done primarily by upperclass students.

Classroom Management Issues. There are several classroom management issues inherent in individualized instruction. These include organizing the shop

environment so that different students can be working on different projects, checking student's work for mastery, guiding students as they progress through individualized tasks, and grading. As one auto mechanics teacher commented, his time is in much more demand in the classroom as he tries to orchestrate students working on their own. An auto mechanics teacher in another school also expressed some difficulty in managing a class and preparing a shop environment where students are working at their own pace. Students that we spoke with in this class mentioned that they were sometimes frustrated by waiting for the teacher in order to take a performance test to complete a task. An electronics teacher describes a competency-based classroom as a "less controlled situation" that is difficult for some teachers to handle.

Administrative Support and Resources

Administrative support is critical for the implementation of any new reform. Teachers described several specific issues where support and resources created barriers to successful implementation of CBVE curricula.

Teacher Compensation and Release Time. Implementing a competency-based curriculum requires additional support and resources for teachers. One important deterrent to curriculum development is the amount of time that it takes to adapt the CBVE Learning Guides to a particular teacher's or school's textbooks and existing curriculum materials. Thus, a key element to successful implementation of a CBVE curriculum is sufficient financial compensation and/or release time for teachers. In addition, compensating teachers for their time and effort indicates that curriculum development is an important priority.

Another type of administrative support comes from the school committee and advisory committee. A machine technology teacher who uses the NTMA materials indicated that all of the members of the advisory committee in his school belong to the NTMA and that they wanted students to be trained according to those standards. Another teacher indicated that this issue can be a particular problem in the licensed trades, when advisory committee members and teachers feel that their curriculum is dictated by licensing requirements.

Classroom Aides. A competency-based curriculum requires a substantial amount of paperwork. As a few teachers noted, classroom aides could be responsible for many of the tasks that use so much of the teacher's time in a competency-based classroom, such as handing out the materials, recording students' performance and correcting tests. Staff in two of the regional centers also suggested that classroom aides

would ease much of the burden on teachers who are implementing a competency-based curriculum.

Clerical Help. The reproduction of Learning Guides is another task that could be accomplished by clerical or support staff to relieve the burden on teachers. In one school, the CBVE Learning Guides are copied by students in a special education class as part of their training.

Audio-visual and Instructional Materials. In order for students to work at their own pace, a competency-based classroom requires materials and models for student practice. As an auto mechanics teacher explained, "You can't tell students that we'll have a valve job in next week to practice on. You have to have models of valves... these resources require money."

Insufficient audio-visual equipment also creates a barrier to competency-based instruction. A carpentry teacher saw a presentation about CBVE at a national convention in which videos were used to present demonstrations for students in a self-paced classroom, but his reaction was "that's pie in the sky at this school." However, at some schools in the state, students can go to a video library and request a tape of a demonstration. Thus, the technology is there, it is the resources that pose the difficulty.

Summary of Key Findings

This section summarizes information obtained from interviews with vocational teachers, district administrators and staff in the regional education centers about the ways in which the Massachusetts CBVE Learning Guides are used in vocational classrooms.

- The Massachusetts CBVE Learning Guides are used as student instructional materials, teacher references and resources for district-level curriculum development.
- While a few of the teachers interviewed use the CBVE curricula as self-paced individualized instructional materials, most teachers incorporate these materials into more traditional group instruction.
- A number of teachers use the CBVE Learning Guides as a reference in developing their own classroom materials, such as adapting or simplifying the instruction sheets or tests, or in planning a course outline based on the task listings.
- The Massachusetts CBVE Learning Guides have been used as the starting point for district initiatives in curriculum development. In these cases, district administrators believe in

local curriculum development and use principles or components of the Massachusetts CBVE materials as a guide for teachers developing competency-based curricula.

- In schools where teachers are actively incorporating the CBVE Learning Guides into their vocational classes, there tends to be a "key player" in the school who is enthusiastic about CBVE and knowledgeable about the process of implementation.
- Other factors that are associated with the implementation of CBVE are: new teachers looking for curriculum ideas and a new program or administrative interest in improving existing programs.
- Starting a CBVE program with an incoming group of ninth graders and receiving technical assistance at the school site also facilitate implementation.
- A number of teachers do not use the Massachusetts CBVE materials at all in their teaching. These are usually teachers who have been teaching for a number of years and have a curriculum with which they are comfortable.
- In some districts, teachers prefer the simpler format or teacher-focus of other types of competency-based materials, such as from Oklahoma or Mid-America.
- Concerns teachers expressed about the use of the CBVE Learning Guides focus on the poor reading skills and active learning style of vocational students, the role of the teacher in a competency-based classroom and the appropriateness of the Learning Guides in shop and related classes.
- Teachers and administrators did not always fully understand the characteristics or components of the Massachusetts CBVE curriculum. Teachers, administrators and regional staff pointed to the need for continued opportunities for technical assistance, particularly by vocational areas.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

This study obtained information about the Massachusetts CBVE project from teachers, administrators, Division of Occupational Education staff, the State Leadership Team and staff at the Massachusetts Vocational Curriculum Resource Center. Across these multiple perspectives, there was a good deal of convergence about the progress of the CBVE curriculum reform effort and recommendations for future steps of the CBVE project in Massachusetts.

This chapter draws together the key findings from the study and presents recommendations about how the state can best continue and expand upon the work accomplished by this project to improve the development and implementation of CBVE curricula in vocational programs across the state. The recommendations focus on two key elements of the CBVE project: development of the CBVE Learning Guides and technical assistance regarding the knowledge and use of these curriculum materials.

Development of CBVE Learning Guides

It is clear that a substantial amount of effort went into the development of the Massachusetts CBVE Learning Guides. Teachers and administrators have commended the state's involvement in this curriculum development. In addition, the process of developing and reviewing these materials has served as a catalyst to other efforts to improve vocational curricula by districts as well as individual teachers. A set of recommendations about how to build on this support and improve these materials are listed below:

1. Begin a systematic process of editing the CBVE Learning Guides that have been disseminated.
 - All of the Learning Guides would benefit from careful proofreading for typographical and spelling errors.
 - The clarity of the writing in the introductions and instruction sheets varies a good deal across tasks within the same Learning Guide. It might be advantageous to have this level of editing done by a technical writer who is skilled in presenting complex information in a clear and simple fashion.
 - The level of difficulty of some passages and the lack of information about the purpose and context of tasks limits the usefulness of these curriculum materials for high

school students. In particular, teachers point out that vocational students are often resistant to or have difficulty reading.

- The knowledge tests and student self-checks also should be reviewed, to ensure that these tests meet accepted standards for test construction. This should be done in conjunction with someone trained in educational measurement.
2. Enlist vocational teachers who are using and adapting the CBVE Learning Guides to revise the content of these curriculum materials.
 - The revision process should build on the experience of vocational teachers who have begun adapting, changing and supplementing these materials for use in their own classrooms.
 - Several teachers as well as staff in the regional centers suggested establishing a statewide network of teachers in each vocational field to determine the revisions needed and divide the responsibility.
 - Involving a group of teachers in the revision process would reduce the cost and increase the "ownership" of the curriculum materials by teachers.
 3. Focus efforts on revising the Learning Guides that currently exist rather than developing CBVE Learning Guides in additional vocational areas.
 - Nearly half of the CBVE Learning Guides are now more than five years old. They need to be updated to be brought in line with new technologies, advances in equipment and revised industry standards.
 - Limited time and resources would be better spent by improving the current materials and increasing their use than on developing additional Learning Guides.
 - The CBVE Learning Guides that are currently available encompass sixteen of the twenty Chapter 74 programs with the highest vocational enrollments (Division of Occupational Education, 1988).
 4. Coordinate efforts that are presently underway to enter the Learning Guides onto computer systems in order to facilitate revisions and upgrade the quality of illustrations.
 - Teachers and staff in the two technical centers funded this year as part of the State Leadership Team contract are currently involved in computerizing a number of the Learning Guides. In addition, we heard about another

school undertaking a similar effort. The revision process would benefit from a coordination of such efforts occurring at separate schools using different computer hardware and software.

- Having the Learning Guides on a computer system would facilitate updating the materials on a regular basis and allow individual schools to insert references to the specific textbooks used in their curricula.

Technical Assistance

In addition to revising the materials, the other focus of the Massachusetts CBVE project should be on providing technical assistance to administrators and teachers about the content of the CBVE Learning Guides and the issues of implementing these curriculum materials in vocational classrooms. As the avenues for technical assistance have expanded in the last year, the interest in and utilization of the CBVE Learning Guides has increased. Recommendations for building on these successes are described below:

1. Increase the number of staff and centers providing technical assistance to vocational teachers.
 - Vocational teachers often commented that the help they received from the State Leadership Team was essential to increasing their understanding of CBVE and implementing the materials in their classrooms.
 - An important factor in facilitating implementation is having enthusiastic teachers who are knowledgeable about CBVE and can provide practical information about using the Massachusetts Learning Guides in vocational classrooms.
 - In particular, the work of David LaPierre and Ray Larivee was applauded. It is likely that their efforts are related to the fact that the CBVE Learning Guides in auto mechanics are among those used most widely by vocational teachers.
2. Establish avenues for vocational teachers to share information about implementing CBVE curricula.
 - Several teachers and administrators cited the value of the Automotive Technology Day, and recommended additional workshops devoted to particular vocational fields.
 - Teachers would benefit from practical suggestions from their peers for implementing the CBVE curricula.

- Most of the mechanisms currently in place focus on bringing administrators together.
3. Widen the network of administrators who receive information about CBVE and provide more specific information about implementation issues.
- Survey results indicate that most of the administrators that have not heard about CBVE work in districts with fewer than five Chapter 74 programs, yet there are CBVE Learning Guides developed in the vocational areas that are most common in these districts (e.g., general merchandising).
 - Much of the information about CBVE is directed to the superintendent-director of regional vocational-technical schools. However, other administrators in these schools, such as an assistant director or director of vocational education, are often more involved in curriculum issues. Strategies should be developed to send information to these administrators as well.
 - Administrative support of curriculum development is an important factor in implementing a CBVE curriculum. It would be useful to provide administrators with information about the issues involved in changing to a competency-based curriculum and to offer suggestions about how they can facilitate implementation.
4. Provide technical assistance to teachers that addresses their concerns about competency-based instruction and facilitates use of the Massachusetts CBVE Learning Guides as self-paced instructional materials.
- Teachers need assistance overcoming the challenges facing vocational education, in general, and the implementation of a competency-based curriculum, in particular. Foremost among these issues is the high percentage of students with special needs.
 - Many teachers feel that the CBVE materials are inappropriate for their students because of their poor reading ability and active learning style.
 - The majority of administrators indicated on the survey that competency-based materials are used in the district. When we visited some of these districts, most teachers used the materials as references or for whole-class instruction.
 - Teachers using CBVE materials in whole-group instruction might benefit from suggestions for classroom management techniques in a self-paced, individualized instructional setting and adaptations in physical space and facilities.

5. Target technical assistance and information about implementing CBVE to individuals and districts most receptive to new curriculum materials: new teachers and districts in the process of revising their vocational curricula.

- New teachers are more receptive to curriculum ideas and are looking for ways to structure the knowledge they bring from the trades and industry. Courses required for teacher approval could be enhanced by providing more information about and practice in the specific issues of adapting and implementing a competency-based curriculum.
- Provide additional training for staff in the regional education centers so that they can recommend the Massachusetts CBVE Learning Guides to districts interested in curriculum reform pursuant to accreditation reviews or Chapter 74 audits.

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APPENDIX A

MAIL SURVEY SENT TO DISTRICT ADMINISTRATORS

**SURVEY OF
COMPETENCY-BASED VOCATIONAL EDUCATION
IN MASSACHUSETTS**



This survey is being conducted for the Division of Occupational Education in the Massachusetts Department of Education. While your participation is completely voluntary, your cooperation is essential to the success of this study. All responses will be strictly confidential; results will be summarized across respondents, without reference to individuals or districts.

Please take time now to complete the questionnaire and return it in the enclosed postage-paid envelope to:

Abt Associates, Inc.
55 Wheeler Street
Cambridge, MA 02138

We would appreciate your response by **March 3, 1989**. If you have any questions, please feel free to call Janet Swartz, Project Director, at (617) 492-7100.

DIRECTIONS

This survey focuses on Competency-Based Vocational Education (CBVE). If there is a Director of Vocational or Occupational Education in your school or district, please have him or her fill out the survey. Otherwise, please direct the survey to the administrator or supervisor most responsible for curriculum decisions.

Your response to this survey is important whether or not your school or district uses CBVE materials. We have tried to keep the survey short so that it can be filled out quickly. Instructions within the survey will direct you to skip over questions that do not apply. For example, if CBVE materials are not currently used in your school or district, you will skip over questions 12 through 18.

Please answer all questions in reference to the district listed on the front cover of the survey.

☐☐☐#
1-3/☒1

4/

COMPETENCY-BASED VOCATIONAL EDUCATION

1. Have you ever heard of Competency-Based Vocational Education?

5/

YES..... ☐-1 (GO TO QUESTION 2)NO..... ☐-2 (GO TO QUESTION 20)

2. How familiar are you with Competency-Based Vocational Education? (Please select the
- one
- response that best describes your knowledge of CBVE.)

6/

a. Have heard of CBVE, but do not know any specifics about it..... ☐-1b. Am aware of CBVE concepts, but have not seen curriculum materials..... ☐-2c. Am familiar with CBVE concepts and materials..... ☐-3

3. How have you learned about CBVE? (Check all that apply.)

a. Publication or newsletter from Department of Education or
Mass. Vocational Curriculum Resource Center..... ☐-1

7/

b. Workshop or conference sponsored by the Department of Education, the State
Leadership Team or the Mass. Vocational Curriculum Resource Center..... ☐-2

8/

c. College course..... ☐-3

9/

d. Visit to Mass. Vocational Curriculum Resource Center..... ☐-4

10/

e. Professional Journal..... ☐-1

11/

f. Administrator or teacher in school or district..... ☐-2

12/

g. Other. Specify: _____..... ☐-6

13/

4. Have you ever looked at or reviewed CBVE curriculum materials?

YES..... ☐-1 (GO TO QUESTION 5)

14/

NO..... ☐-2 (GO TO QUESTION 7)

5. The Division of Occupational Education in the Mass. Department of Education has funded the development of CBVE curriculum materials since 1982. Other states and organizations also have developed competency-based curriculum materials for vocational education. If you have reviewed CBVE materials, which types have you seen? (Check all that apply).
- | | | |
|--|-----------------------------|-----|
| a. Massachusetts CBVE materials..... | ☐ -1 | 15/ |
| b. CBVE materials of other states..... | ☐ -2 | 16/ |
| c. CBVE materials from curriculum organizations..... | ☐ -3 | 17/ |
| d. Other. Specify: _____ | ☐ -6 | 18/ |
6. If you have reviewed CBVE materials, where have you seen them? (Check all that apply for Mass. CBVE and other CBVE materials.)
- | | Mass.
CBVE | Other
CBVE | |
|---|-----------------------------|-----------------------------|--------|
| a. Mass. Vocational Curriculum Resource Center..... | ☐ -1 | ☐ -2 | 19-20/ |
| b. Curriculum library in your school or district..... | ☐ -3 | ☐ -4 | 21-22/ |
| c. Workshop or conference..... | ☐ -1 | ☐ -2 | 23-24/ |
| d. College class or library..... | ☐ -3 | ☐ -4 | 25-26/ |
| e. Other. Specify: _____ | ☐ -6 | ☐ -6 | 27-28/ |

AFTER ANSWERING QUESTIONS 5 AND 6, PLEASE GO TO QUESTION 8.

7. If you have never reviewed CBVE curriculum materials, what were the reasons? (Check all that apply.)
- | | | |
|---|-----------------------------|-----|
| a. Did not know that they were available..... | ☐ -1 | 29/ |
| b. Did not know where they were available..... | ☐ -2 | 30/ |
| c. Not interested in this approach to curriculum..... | ☐ -3 | 31/ |
| d. Not interested in changing present curriculum..... | ☐ -4 | 32/ |
| e. No time available to review materials..... | ☐ -1 | 33/ |
| f. Other. Specify: _____ | ☐ -6 | 34/ |

AFTER ANSWERING QUESTION 7, PLEASE GO TO QUESTION 8.

8. Are CBVE curriculum materials of any type presently used in vocational classes in your school or district? This can include use or adaptation of materials as references or resources.

YES ☐ -1 (GO TO QUESTION 12)

35/

NO ☐ -2 (GO TO QUESTION 9)

9. If CBVE materials are not currently used in your school or district, have you ever considered using any type of CBVE curriculum?

YES ☐ -1 (GO TO QUESTION 10)

36/

NO ☐ -2 (GO TO QUESTION 11)

10. If your school or district has considered CBVE materials, but has decided against using them, please tell us the main reasons for this decision.

37-41/

- 10a. If your school or district has considered using CBVE curriculum materials, but has not yet implemented the curriculum, is there additional information or help that would facilitate implementation? (Check all that apply.)

a. Additional information about curriculum..... ☐ -1

42/

b. Additional technical assistance in using curriculum..... ☐ -2

43/

c. Additional teaching staff..... ☐ -3

44/

d. Additional support staff..... ☐ -4

45/

e. Additional funds for materials or equipment..... ☐ -1

46/

f. Other. Specify: _____ ... ☐ -6

47/

AFTER ANSWERING QUESTION 10, PLEASE GO TO QUESTION 19.

11. If your school or district has never considered using any type of CBVE curriculum, please tell us why.

48-52/

AFTER ANSWERING QUESTION 11, PLEASE GO TO QUESTION 19.

12. Massachusetts CBVE materials are currently available in the 13 vocational areas listed in Question 14. Other states and organizations also have developed CBVE materials. In addition, teachers have created their own competency-based curriculum materials.

What types of competency-based curriculum materials are being used in your school or district? This can include use or adaptation of materials as references or resources. (Check all that apply.)

- | | | |
|--|-----------------------------|-----|
| a. Massachusetts CBVE materials..... | ☐ -1 | 53/ |
| b. CBVE materials from other states or organizations..... | ☐ -2 | 54/ |
| c. CBVE materials created by school or district staff..... | ☐ -3 | 55/ |
| d. Other. Specify: _____ | ☐ -6 | 56/ |

13. If you are using CBVE materials other than Massachusetts CBVE materials, please tell us the reasons for this choice.

57-61/

- 13a. Please list below the vocational areas in which CBVE materials other than Massachusetts CBVE are used in your school or district.

62-71/

FOR CODING PURPOSES ONLY

☐☐☐ 1-3/

☒ 2/ 4/

14. Listed below are the vocational areas in which Massachusetts CBVE Learning Guides are available. For each area, please indicate whether Massachusetts CBVE Learning Guides are currently used in classrooms in your school or district. This can include use or adaptation of materials as references or resources. (If a course is not offered, please check that box.)

	MASS. CBVE USED		COURSE NOT OFFERED	
	YES	NO		
Auto mechanics.....	☐ -1	☐ -2	☐ -3	5/
Child development assistant.....	☐ -1	☐ -2	☐ -3	6/
Computer technology.....	☐ -1	☐ -2	☐ -3	7/
Drafting.....	☐ -1	☐ -2	☐ -3	8/
Electrical technology.....	☐ -1	☐ -2	☐ -3	9/
Electronics.....	☐ -1	☐ -2	☐ -3	10/
Food management, production and service.....	☐ -1	☐ -2	☐ -3	11/
General merchandising.....	☐ -1	☐ -2	☐ -3	12/
Health assistant.....	☐ -1	☐ -2	☐ -3	13/
Hotel and lodging.....	☐ -1	☐ -2	☐ -3	14/
Machine shop.....	☐ -1	☐ -2	☐ -3	15/
Medical assistant.....	☐ -1	☐ -2	☐ -3	16/
Ornamental horticulture.....	☐ -1	☐ -2	☐ -3	17/

IF YOU ANSWERED "YES" IN ANY AREA ON QUESTION 14, PLEASE
GO TO QUESTION 15. OTHERWISE, GO TO QUESTION 16.

15. How did you decide to implement Massachusetts CBVE curricula in these particular areas?
(Check all that apply.)

a. Only programs offered in which CBVE materials available.....	☐ -1	18/
b. Felt CBVE curricula best suited to these program areas.....	☐ -2	19/
c. Interest of individual teacher.....	☐ -3	20/
d. In process of changing curriculum in this area.....	☐ -4	21/
e. In process of changing entire curriculum.....	☐ -1	22/
f. Other. Specify: _____ ...	☐ -6	23/

16. What do you see as the strengths or advantages of Massachusetts CBVE curricula?

24-28/

17. What do you see as the limitations or disadvantages of the Massachusetts CBVE curricula?

29-33/

18. Listed below are the vocational areas in which Massachusetts Math/Science Competencies (MSC) are available. For each area, please indicate whether Massachusetts Math/Science Competencies are being used in your district or school by vocational teachers, academic teachers or both. (If a course is not offered, please check that box.)

	Mass. MSC Used			Not Used	Course Not Offered	
	Voc	Academic	Both			
Auto mechanics.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	34/
Computer technology.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	35/
Electrical technology.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	36/
Food management, production and service.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	37/
General merchandising.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	38/
Health assistant.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	39/
Hotel and lodging.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	40/
Medical assistant.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	41/
Ornamental horticulture.....	☐ -1	☐ -2	☐ -3	☐ -4	☐ -5	42/

19. Have Mass. CBVE materials ever been used in your school or district and been discontinued?

YES ☐ -1 (CONTINUE)

43/

NO ☐ -2 (GO TO QUESTION 20)

19a. What were the reasons for discontinuing Mass. CBVE curricula? (Check all that apply.)

a. Student difficulty with this method of instruction..... ☐ -1 44/

b. Change of teaching personnel..... ☐ -2 45/

c. Difficulty adapting materials to own equipment/supplies..... ☐ -3 46/

d. Too much paperwork..... ☐ -4 47/

e. Course no longer offered..... ☐ -1 48/

f. Other. Specify: _____ ☐ -6 49/

19b. In what vocational areas have Mass. CBVE materials been discontinued?
(Please list below.)

50-59/

RESPONDENT INFORMATION

20. What is your current job title? (Select one response).

a. Superintendent or Superintendent-Director..... ☐ -1 60/

b. Asst. Superintendent or Asst. Superintendent-Director..... ☐ -2

c. Curriculum Director..... ☐ -3

d. Director or Coordinator of Vocational or Occupational Education..... ☐ -4

e. Principal..... ☐ -5

f. Assistant Principal..... ☐ -6

g. Department Head..... ☐ -7

h. Other. Specify: _____ ☐ -8

PLEASE USE THIS PAGE FOR ANY ADDITIONAL COMMENTS:

THANK YOU VERY MUCH FOR YOUR COOPERATION.
PLEASE RETURN THE COMPLETED SURVEY IN THE
POSTAGE-PAID ENVELOPE PROVIDED.

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APPENDIX B

**CRITERIA FOR EXAMINING MASSACHUSETTS
CBVE LEARNING GUIDES**

CRITERIA FOR EXAMINING CBVE LEARNING GUIDES

I. EXAMINATION ACROSS CBVE LEARNING GUIDES

A. Organization

Are the guides written using the same format, specifications?
(e.g., similar coding system)

Do the guides have the same internal logic? (e.g., duties,
performance objectives, enabling objectives)

II. EXAMINATION WITHIN A CBVE LEARNING GUIDE

A. Global Organization

1. Consistency

Is the same format used throughout guide for labelling of duties,
performance and enabling objectives?

2. Relationship between broad duties and specified tasks

Are the duties clear, specific, consisting of observable
behaviors?

B. Analysis of CBVE Components

1. Tasks, Duties and Performance Objectives

Is the relationship between performance objective and enabling
objective(s) clear?

Duties and tasks should use present tense action verbs, describe
measurable behavior (e.g., explain, describe).

Tasks should stand alone, not depend on other statements to be
complete.

Tasks should result in list of steps logically leading to an
observable result.

Is there a standard for evaluating performance?

2. Learning Activities

a. Relationship of activity to enabling objective

Is the activity an appropriate choice, given the objective?

Is written presentation of material a logical and useful form to be used to help students master objectives?

b. Presentation/attractiveness

Will materials appeal to students? Is the quality of reproduction good? Are they "simple and eye appealing"?

Are they double-spaced with adequate "white space"?

Are there headings and subheadings?

c. Readability

Is the material written so that high school students will be able to comprehend it?

Is text "short, specific, directly related to enabling objectives"?

Are technical terms defined?

d. Quality of writing

Is the piece well-organized, with clear paragraphs, relevant to the main point?

Are the ideas within the piece presented in a style that might make it interesting for students to read?

Have the written instruction sheets been adequately edited? Is the spelling, punctuation and capitalization correct?

3. Criterion-Referenced Tests

a. Measure of skill or performance

How well do the tests relate to the enabling objective?

Do tests include only what was taught?

Are the steps and standards clearly described?

b. Follow rules for test construction

Are the multiple choice options plausible?

Are the alternatives of similar length and consistent with grammar of stem?

Are the stems written clearly, without confusing negatives?

Do the word fill-in tests require recollection of the most important concepts related to objective? Are blanks at end, so they don't obscure meaning of the sentence?

Do true-false questions avoid using "never", "none", "always"?

4. Performance Tests

Are the tests good measures of skill performance to be evaluated?

How well do the tests relate to the enabling objective?

Do tests include only what was taught?

Are the steps and standards clearly described?

APPENDIX C

**STATE-LEVEL OCCUPATIONAL EDUCATION
STAFF AND ADMINISTRATORS INTERVIEWED**

**STATE-LEVEL OCCUPATIONAL EDUCATION
STAFF AND ADMINISTRATORS INTERVIEWED**

Division of Occupational Education
Massachusetts Department of Education

Dr. David Cronin
Associate Commissioner

Mr. John McDonagh
Director, Bureau of Research, Planning and Evaluation

Ms. Elaine Cadigan
Director, Bureau of Program Services

Occupational Education Team Leaders and Staff

Central Massachusetts Regional Education Center

Greater Springfield Regional Education Center

Northeast Regional Education Center

Southeast Regional Education Center

State Leadership Team

Ms. Sheila Herbert
Greater Lowell Regional Vocational-Technical School

Mr. William Burns
Greater Lowell Regional Vocational-Technical School

Mr. Paul Wholey
Greater Lowell Regional Vocational-Technical School

Mr. David LaPierre
Pathfinder Regional Vocational-Technical School

Mr. Ray Larivee
Cape Cod Regional Vocational-Technical School

Massachusetts Vocational Curriculum Resource Center (MVCRC)

Carol Laughlin
Director, MVCRC

Dr. Ronald Fitzgerald
Superintendent-Director, Minutemen Vocational-Technical School

APPENDIX D

INTERVIEW GUIDES FOR SITE VISITS

INTERVIEW WITH TEACHERS USING CBVE

Name: _____

Field: _____

School: _____

Interviewer: _____

Introduction

Thank you for agreeing to talk with us. To fill you in on the purpose of our study -- we are talking with teachers in 10 school districts across the state about Competency-Based Vocational Education (CBVE). We are interested in how teachers use the materials and in their recommendations.

This is part of a project for the Division of Occupational Education. Our final report to the Department will summarize the information we have heard and will not identify any individuals. All of your comments will be kept strictly confidential.

[IF INVOLVED IN DEVELOPMENT, ASK THOSE QUESTIONS HERE]

Mass. Competency-Based Vocational Education

First [Now], we'd like to talk about the Competency-Based Vocational materials developed in Massachusetts.

1. Do you use the Massachusetts CBVE materials in any way in your teaching?

Probe: reference for planning course curriculum

[IF YES, CONTINUE]

[IF NO] Are you familiar with Massachusetts CBVE materials?

[IF YES] Why did you decide not to use these materials?

[GO TO QUESTION 7 ON PAGE 5]

2. Would you describe the ways in which you use these materials?

Probe: Mainly teacher use or do students use?

Use materials for full range of tasks in curriculum?

Are CBVE Learning Guides xeroxed for students?

Teacher vs. student use for:

- Task listings
- Performance objectives
- Learning activities
- Instruction sheets
- Knowledge tests
- Performance tests

What are the reasons why you're not using certain components--students (reading level), resources or equipment not available, don't teach that skill or task

Is student use of materials self-paced?

3. In what ways have you adapted the Massachusetts CBVE materials to fit your classroom?

Probe: Textbooks/Equipment
Student needs

4. What obstacles, if any, did you experience in getting this competency-based program started in your classroom?

Probe: Administrative support
Clerical support
Financial support
Technical assistance
Equipment
Release time
Availability of materials

5. What factors helped you get this program started in your classroom?

Probe: Administrative support
Clerical support
Financial support
Technical assistance
Equipment
Release time
Availability of materials

6. Do you have any recommendations for improving the Massachusetts CBVE materials for you and other teachers?

Math/Science Competencies

7. Do you use the Massachusetts Math/Science Competencies in any way in your teaching?

Probe: reference for planning course curriculum

[IF YES, CONTINUE]

[IF NO] Are you familiar with Math/Science competencies?

[IF YES] Why did you decide not to use these materials?

[GO TO QUESTION 9]

8. Would you describe the ways in which you use these materials?

Probe: Mainly teacher use or do students use?
Academic teachers use?

Other CBVE

9. Do you use any other types of Competency-Based vocational materials in your classroom? What types?

Probe: Developed own

Use commercially available materials from: Mid-America,
Oklahoma, V-TECS, Professional/trade organizations

10. Would you describe the ways in which you use these materials?

Probe: Mainly teacher use or do students use?

Use materials for full range of tasks in curriculum?

Are materials xeroxed for students?

What are the reasons why you're not using certain components?

Is student use of materials self-paced?

11. What do you see as the advantages of these materials?

12. If you have developed your own materials, would you describe this process?

Probe: Time line
Resources -- financial, clerical, teachers' time
Technical assistance
Administrative support or encouragement

INTERVIEW WITH TEACHERS WHO HAVE DEVELOPED MASS. CBVE

Name: _____

Field: _____

School: _____

Interviewer: _____

We'd like to learn more about your involvement in the development of Massachusetts CBVE Learning Guides.

1. How did you get involved in the development of these materials?

Probe: Have you ever developed other curriculum materials?

2. What kind of training did you receive?

Probe: How helpful was it?
Who provided training?
Was training sufficient?

3. How long did it take you from start to finish?

Probe: Award of grant/receipt of funds
Advisory Committee
Validate task listing
Edits/revisions

4. What kind of support did you receive while you were writing the curriculum?

Probe: Release time/pay/substitutes
Help from State Leadership Team
Collaboration among staff in school (English or academic teachers)
Clerical help

5. Do you think there are ways that this process could be improved?

INTERVIEW WITH ADMINISTRATORS

Name: _____

Title: _____

School: _____

Interviewer: _____

Introduction

Thank you for agreeing to talk with us. To fill you in on the purpose of our study -- we are talking with teachers and administrators in 10 school districts across the state about Competency-Based Vocational Education (CBVE). We are interested in how these materials are used in the classroom.

This is part of a project for the Division of Occupational Education. Our final report to the Department will summarize comments from teachers and administrators and will not identify any individuals. All of your comments will be kept strictly confidential.

1. How did the school first get involved with the Massachusetts CBVE curriculum?

Probe: Particular teacher/administrator interest
Department of Education staff
Professional development conference

2. How do teachers in your school get the CBVE materials?

3. How have teachers responded to CBVE?

4. What obstacles, if any, did you or your teachers experience in getting CBVE started in the school?

Probe: Administrative support
Clerical support
Financial support
Technical assistance
Equipment
Release time
Availability of materials

5. What factors helped you or your teachers to get this program started in the school?

Probe: Administrative support
Clerical support
Financial support
Technical assistance
Equipment
Release time
Availability of materials

6. Do you have any recommendations for improving the CBVE materials for teachers?